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## C., N. O. &amp; T. P. Train Rules.

Receiver S. M. Felton, of the Cincinnati, New Orleans & Texas Pacific, has lately issued a revised edition of the book of rules for employees in the transportation department of the road, making important additions. The first 121 rules (The Standard Code of the American Railway Association) are numbered as originally issued in that code; that is, from 1 to 121. In this part we notice but few variations from the standard. The "general notice" is improved. Inferior trains must clear those of higher class 10 minutes. Under rule 89 freight trains must keep 10 minutes apart during the day and 15 minutes apart at night. Under rule 93 a train having the right to the road must wait at a meeting point five minutes if the other train has not arrived. Rule 99 is quite elaborate, covering three pages.

Following rule 121 are regulations for special order books and bulletins. Besides the usual bulletins at the terminal stations and engine-houses, each conductor and engineman keeps a file of special orders.

The telegraph-order rules, like those before them, have their old numbers, 500 to 527. Rule 524 has 10 supplementary paragraphs. The examples under forms of train orders are filled out with names of real stations on the line of the road.

Following this chapter are four pages of general rules for officers and employees, being somewhat in the nature of additions to the general rules (Nos. 1 to 10) in the first part of the code. These general rules include a list of standards to be used in selecting the sizes of paper for blanks, and the well-known clause (originally found, we believe, in the code in the Lake Shore & Michigan Southern) stating that no general relation of superiority exists between different classes of employees—that, except as provided in the code, no employee among those named has any superiority over another.

Following the rules for train dispatchers are brief regulations for Boards of Examiners in examining conductors and enginemen. These examinations must cover moral, mental and physical qualifications, in the order named. High temper, rashness or anything likely to impair self-control is a moral disqualification. The physical examination must determine if the candidate has "good ability to distinguish color"; but we find no description of the tests to be imposed.

Rules for different classes of employees are provided for no less than 32 different classes, including superintendents. These rules begin at No. 530. Beginning with No. 600, which is the first rule for enginemen, they are very comprehensive and full, being copied in nearly every case (up to Rule 1,200) from the code which appears in the Appendix to the *Proceedings* of the American Railway Association for October, 1894, but which was never adopted by that association, or even approved by the committee which reported it.

Very few of the rules reported by the committee of the association are omitted and not many are modified. Where modification has been undertaken it has been in some cases mistaken, as for instance, an addition to rule 609, which simply repeats what could already be found in rule 627. Rule 613 says that in case of the forced absence of the engineman the fireman may handle the engine, provided the proper officer has declared him competent. In rule 690 the term "helping engine" is substituted for pilot engine. The last three lines of rule 806 are omitted. In Rule 707 the first four words, "Do not forget to," are omitted.

Rule 827 is followed by one prescribing extreme caution in case of extraordinary rainstorms. An addition to Rule 853 says, "Request passengers to show their tickets before entering coach, directing those who have no tickets to the ticket office to procure them." Rule 855 contains a provision for seating day-car passengers in

sleeping-cars, in emergencies. Rule 869 omits the specifications shown in the committee report. Rule 882 has a considerable addition, giving in detail the procedure for taking up tickets in sleeping-cars. Rule 904 has four supplementary paragraphs, giving in detail rules for sealing and examining seals. Rule 906 says, "Place cars fitted with air-brakes in the forward part of the train." Rule 915 is omitted. Rule 916, the subject of which is dealt with in an addition to Rule 904, is omitted, and in place of it is a rule requiring conductors of way freight trains to consolidate freight into full carloads as far as practicable, irrespective of whether or not there are surplus empty cars going in the same direction. Rule 926 requires conductors to consult the wishes of drovers and to give especial care to animals without attendants. In warm weather trainmen must water hogs as often as may be necessary without being requested to do so.

Rule 935 is used in full. Rule 1,019 is omitted.

"Switch tender" is the title applied to a man who throws switches, not "switchman," as recommended by the committee. The rules for this class are copied in full, except No. 1,056.

Rule 1,100 is omitted, and Rule 1,101 requires the approval of the Superintendent. Under Rule 1,104 operators are appointed by the Division operator without consultation with any other officer.

There is no chief lineman, but Rule 1,111, for division linemen, who report to the Division Operator, is quite long, filling a page and a half. Rules 1,112 and 1,113 are omitted. Rule 1,126 requires red and white lights to be burning in the office all night and requires torpedoes to be used in stopping trains for orders. Rule 1,128 requires operators to leave their house address in the office window when the office is closed at night.

Rule 1,149 requires passes sent by telegraph to be written in ink and to bear the full signature of the receiving operator. Rule 1,150 requires bulletin notices of passenger trains behind time.

Rules 1,200 to 1,414 are for station agents, baggage agents, roadmasters, supervisors, track foremen, conductors of construction trains, road watchmen, master carpenters, bridge watchmen, car inspectors and coal-station keepers. These classes of employees were not considered in the committee report referred to, but the language of the rules under these heads has been made to conform to Mr. Hammond's style, so that all of the "general regulations" (530 to 1,414) make a harmonious whole.

Mr. Felton has prepared catechisms for conductors, enginemen and telegraph operators, which are printed on paper 8 in. x 14 in., with spaces for written answers. These, like most catechisms, contain too many questions which can be answered by a simple "yes" or "no."

We give below a sample of the style of the committee's rules constituting the latter part of this code, in the shape of an extract from the enginemen's rules. For enginemen there are 93 rules, and this extract consists of the seventh subdivision. Words in brackets are those which have been supplied by Mr. Felton, and he has made one or two slight alterations. He has rejected a part of Rule 649, which forbids the presence of more than one engine on a drawbridge at the same time.

[Extract.]

## PRECAUTIONS WHILE RUNNING.

632. Never run the engine backward on main line, except in cases where absolutely necessary.

633. Never leave the direct charge of the engine while running a trip, except when called to sign train orders; while absent the fireman must remain on the engine.

634. Keep a constant and vigilant lookout ahead [approach road crossings at grade carefully, using the whistle signal as provided in Rule No. 49]; be watchful for all signals; so far as possible, see that all switches are set right, and that switch lights are burning at night; observe whether watchmen, brakemen, crossing tenders, signalmen and switchmen are at their posts and properly attending to their duties; notice anything unusual or dangerous along the road, at stations, bridges, yards or on other trains met or passed; and instruct fireman to do the same when not attending to other duties.

635. When starting from a station, have the fireman look back on the platform side until last car has passed the platform, to see that the whole of the train is following safely and properly, and to notice any signal from station or trainmen. If a passenger car is next to the engine, look out for the safety of passengers getting on or off the forward platform.

636. Look back frequently when running freight trains, to see that all is right, and have fireman do the same.

637. When starting passenger train from terminal or any point where the make-up of train has been changed, before proceeding 1,000 feet, try the air-brake to see if it is in good working order; also make a similar test when within a mile of a junction or crossing where stop should be made, or when approaching stop signals.

638. When passing a train in a siding, see that its cars do not overhang the fouling point.

639. Always approach facing-point switches with great care, and, unless they are interlocked with signals that are controlled by signalmen, reduce speed so as to know that such switches are right before passing them.

640. Approach short curves with care: reduce speed to avoid inconveniencing passengers when rounding such curves. Take position so as to keep sharp lookout on inside of curve till straight track is reached.

641. Approach all meeting, telegraph, terminal and important stations slowly, with train under full control, and without sudden and violent applications of the brake, and be sure the engine bell is rung as required by Rules 69 and 70. Use extreme caution when passing, without stopping, stations where passengers are standing on or near the tracks. Where tracks are not fenced off at a station, never pass another train standing there and taking or leaving passengers.

642. The brakes must not be relied on wholly when approaching railroad crossings or hazardous places, but steam must be shut off, and the train held under such control as to absolutely prevent running over crossings before stopping.

643. Never, under any circumstances, run train ahead of schedule time. See that regular and uniform motion is maintained without sudden increase or checking of

speed. Be careful not to allow too high speed on down grades, and run with due caution in passing places where track is under repair. (See Rule 92.)

644. Never run a regular or extra train (or detached engine) at greater than time-card speed without special orders. No excuse will be received for racing with trains upon parallel roads.

645. During foggy, thick, or stormy weather, if delayed on any part of the road, do not attempt to make up time: take extraordinary precautions at switches at all places where right to proceed depends upon signals; and inquire at stations and junction points as to the time of leaving of preceding trains. Remember that such trains are also acting under these instructions. (See Rule No. 605.)

646. When rails are in bad condition, endeavor not to slip drivers; but use no sand over frogs and switches, if possible to avoid it, or between interlocking signals.

647. Use every precaution against fire, and allow no coal, wood, waste, hot cinders or anything else to be thrown or dropped from the engine or tender; nor allow ash-pan or smoke-arch to be cleaned, except at points specially designated by the Superintendent.

648. The fire must not be drawn in front of stations or buildings, nor on crossing, frogs or switches; whenever fire is drawn, it must be put out before leaving it.

649. While crossing bridges and trestles, also when passing close to wood piles and wooden structures, or trains loaded with cotton, do not allow fire to be disturbed or grates shaken, keep dampers closed, and work as little steam as possible. Do not apply air-brakes when on bridges or trestles, except in emergencies. Be careful not to cross a drawbridge until sure that all is right.

650. When running by night, keep in mind the proper number of switches at each point, so as to know before reaching them whether all are lighted; and if any are not seen, reduce speed until tracks are known to be right. Report all such failures of lights.

651. Stop trains, if necessary, to prevent injuring persons or live stock.

## Railroad Legislation in New Jersey.

The four laws affecting railroads which were passed by the last legislature of New Jersey may be briefly summarized as follows:

Chapter 26 extends the time for the construction of any railroad, which, under previously existing acts, ought to have been completed by Dec. 31, 1898, for the further period of two years, provided money has actually been expended since Jan. 1, 1896; but this act shall apply only in case the corporation shall agree to waive all rights of exemption from taxation, etc.

Chapter 69 provides for paying to the towns or other local taxing districts the tax money collected from railroads and canals on real estate which is separately valued under subdivision 2 of section 3 of the tax laws of 1884 and 1888, being railroad property outside the right of way.

Chapter 150 amends the act of March 9, 1885, to prevent frauds upon travelers. Section 2 of that act now makes it unlawful for an unauthorized agent to deal in railroad tickets, passes, etc., and revises the requirements for redemption of unused and partly used tickets. The sale by any person of the unused portion of any ticket, otherwise than by presentation of the same for redemption, is made unlawful.

Chapter 162 requires the transportation of one bicycle for each passenger, in lieu of other baggage, "provided facilities for the transportation of baggage then exist" on the train or boat by which the passenger travels. The passenger must have removed the lantern from the bicycle, but shall not be required to remove an ordinary bicycle bell or cyclometer; and the carrier shall not be liable for damage to the bell or cyclometer, or to any such like attachment. Refusal to comply with this law subjects the railroad to a forfeit of \$10, to be paid to the passenger.

## Interstate Commerce Commissioners' Views.

Senator Cullom, Chairman of the Senate Committee on Interstate Commerce, having asked the Interstate Commerce Commissioners for their opinions on the proposition to authorize the pooling of railroad earnings, has received responses from four of them. Messrs. Morrison and Clements send a long letter, giving substantially the same views presented to the Congressional Committee on Jan. 28; Messrs. Yeomans & Prouty send a qualified approval of this letter, and Commissioner Knapp says nothing. The substance of the majority opinion is well known. It is held that nothing ought to be done by Congress until autumn, when the various questions now pending before the Supreme Court probably will have been settled; that even then pooling should not be authorized, but if it is authorized, the railroads should be made to specify the rates on the traffic which they wish to pool. The Commissioners say that the provision authorizing the annulling of a pool by the Commission would be hard to enforce; that the time of notice of increase or reduction of rates ought to be extended to at least 60 days; that the clause of section 9, made needless by the Brown decision, should be correspondingly modified; that the imprisonment clause should not be repealed; that the provision making the findings of the Commission (as to facts) *prima facie* evidence in court should be retained; that the Commission should be empowered to determine what is, as well as what is not, a reasonable rate, and means provided for enforcing such a determination; that obedience to an order of the Commission in such a matter should be obligatory on the carriers at once and until set aside by a court; that the law compelling uniform classification should be passed at once, and finally that the recommendation of the Commission in its last annual report, page 13, concerning rates on imported goods, should be at once embodied in law.

Messrs. Yeomans and Prouty say:

We concur in the foregoing suggestions, with the fol-



lowing qualification: We would not oppose the passage of a pooling bill, provided the other amendments which are necessary to make the interstate commerce law effective were made as a part of that bill. We are opposed to the passage of the pending bill or of any other pooling bill until this commission is given by suitable amendment the power in fact which it is supposed to have and must have in order to carry out the purposes of the act to regulate commerce. We believe that the questions involved in the proposed legislation are of paramount importance, and should only be acted upon with the most mature consideration, and that any legislation at the present time would be unwise.

**Dolton Interlocking Plant.**

An important interlocking plant is now being built near Dolton, Ill., at the crossing formed by the intersection of the Pittsburgh, Cincinnati, Chicago & St. Louis, the Chicago & Western Indiana, the Chicago & Calumet Terminal, and the Chicago, Hammond & Western railroads. The three roads last named are belt or freight transfer lines which connect at this point with the Pittsburgh, Cincinnati, Chicago & St. Louis and the Chicago & Eastern Illinois, which uses the Chicago & Western Indiana, and the traffic over the crossings and the connecting tracks is very heavy.

A plan of the arrangement of the tracks, signals, switches, etc., is shown in Fig. 1. The dotted lines indicate the location of proposed tracks which have been considered in the preparation of the plans, and 11 spare spaces are provided in the machine for their operation. The plans were made under the direction of Mr. J. B. Cox, Assistant Engineer of the Chicago, Hammond & Western, and were approved by the signal engineers of the other roads. The machinery was built and is being put in by the Union Switch & Signal Company. The tower, which is built according to the latest standards of the Signal Company is 22 ft. wide by 80 ft. long. Each of the windows of the second story consists of a single sash 26 in. x 48 in., with a transom above. The transoms are hinged at the top and all open outward and provide means for ventilation, while at the same time they form a protection against rain or snow entering and damaging the machinery. The windows are fixed with the exception of those at the ends, which open the same as the transoms and permit the operators to communicate with persons on the tracks. An

stands of a pattern similar to the three-way, which are used in the combination with the three-way, where there are so many pipes as to require it. A similar style of angle crank is used outside the tower in a number of places where the pipes are spaced 2 1/4 in. center to center both ways. A special form of deflecting bar is used in turning the angle at the crossing of the Pittsburgh, Cincinnati, Chicago & St. Louis, and the Chicago & Western Indiana, which avoids the spreading of the pipe lines. This consists of a link, to either end of which the pipes are attached, forming two movable joints, which carry rollers; the rollers in turn run in guides formed in a casting, and the whole is boxed in to keep the parts clean. All the crossings are provided with crossing bars. Wharton derailleurs are used on the Pittsburgh, Cincinnati, Chicago & St. Louis tracks. Travis derailleurs are used on the connecting track in front of the tower at switches Nos. 53 and 100, as the guard rails placed at these points, on account of the sharp curve on the track, prevent the use of the ordinary point derailleurs, which are employed except at the places named.

There are mechanical interlocking plants in England having a greater number of working levers than the one here described, but at the present time the Dolton plant is the largest mechanical interlocking in this country. It is expected that it will be ready for operation by the middle of June.

**Train Accidents in the United States in April.**

**COLLISIONS.**

**REAR.**

3d, on Norfolk & Western, at Rawl, W. Va., a work train standing on the main track was run into at the rear by a freight; 1 employee killed and 3 injured.

5th, on Lake Shore & Michigan Southern, at Buffalo,

killed, and 6 trainmen and 2 express messengers and 1 tramp were injured.

29th, 9 p. m., on Chicago, Rock Island & Pacific, at Caldwell, Kan., butting collision between a passenger train and a freight, badly damaging both engines. The passenger engineer jumped off and was badly injured. It is said that the collision was due to a misplaced switch.

**CROSSING AND MISCELLANEOUS.**

9th, on Norfolk & Ocean View road, near Norfolk, Va., collision between a freight train and a work train due to a misplaced switch; 1 employee killed and 2 injured.

12th, on Charleston & Savannah, near Yemassee, S. C., a freight train entering a side track was run into by a passenger train and 2 freight cars were wrecked. The passenger fireman jumped off and was injured.

13th, 3 a. m., on Pennsylvania road, at Jersey City, N. J., a train of empty passenger cars being run into the terminal station became uncontrollable, the engine having been detached, and collided with great force with a passenger car standing at the end of the track in the station; this car was forced over the bumping post and across the platform to within three feet of the waiting-room. Three employees sleeping in the standing car were injured. It is said that there was only one brakeman to control the speed of the moving cars, that the brake chain he was using broke and that the car-doors were locked, so that he could not run to another brake in season to stop the cars before they reached the standing car.

15th, at Atlantic City, N. J., a passenger train of the Atlantic City Railroad was run into by a passenger train of the West Jersey & Seashore road at the crossing of the two lines at Baltic and Illinois avenues, and a parlor car of the former train was wrecked, being struck in the side by the engine of the other train. This car carried no passengers, however, and the only injuries were those of the porter and of one brakeman, which were slight.

21st, on Lake Shore & Michigan Southern, at Erie, Pa., collision of freight trains, badly damaging an engine and a caboose. The engineman was killed and the fireman injured.

And 8 others on 8 roads, involving 6 passenger and 8 freight and other trains.

**DERAILMENTS.**

**DEFECTS OF ROAD.**

2d, on Chicago Great Western, near Waverly, Ia., a freight train was derailed by spreading of rails, and the caboose was overturned. Two passengers riding in the caboose were injured.

3d, on Oregon Short Line, near Malad, Idaho, a passenger train was derailed at a switch and 4 passenger cars were derailed. One passenger was killed and 1 trainman and 4 passengers were injured. It is said that a breakage of some part of the switch was the cause of the derailment.

19th, on Great Northern, near Bear Creek, Mont., a passenger train drawn by two engines was derailed by a broken rail and both engines fell down a bank, one of them tumbling 200 ft. Both enginemen and both firemen were injured.

29th, on Wheeling & Lake Erie, near Carpenter, O., a freight train broke through the bridge over Big Short Creek and the engine and 22 empty coal cars fell to the river 45 ft. below. The engineman and fireman were

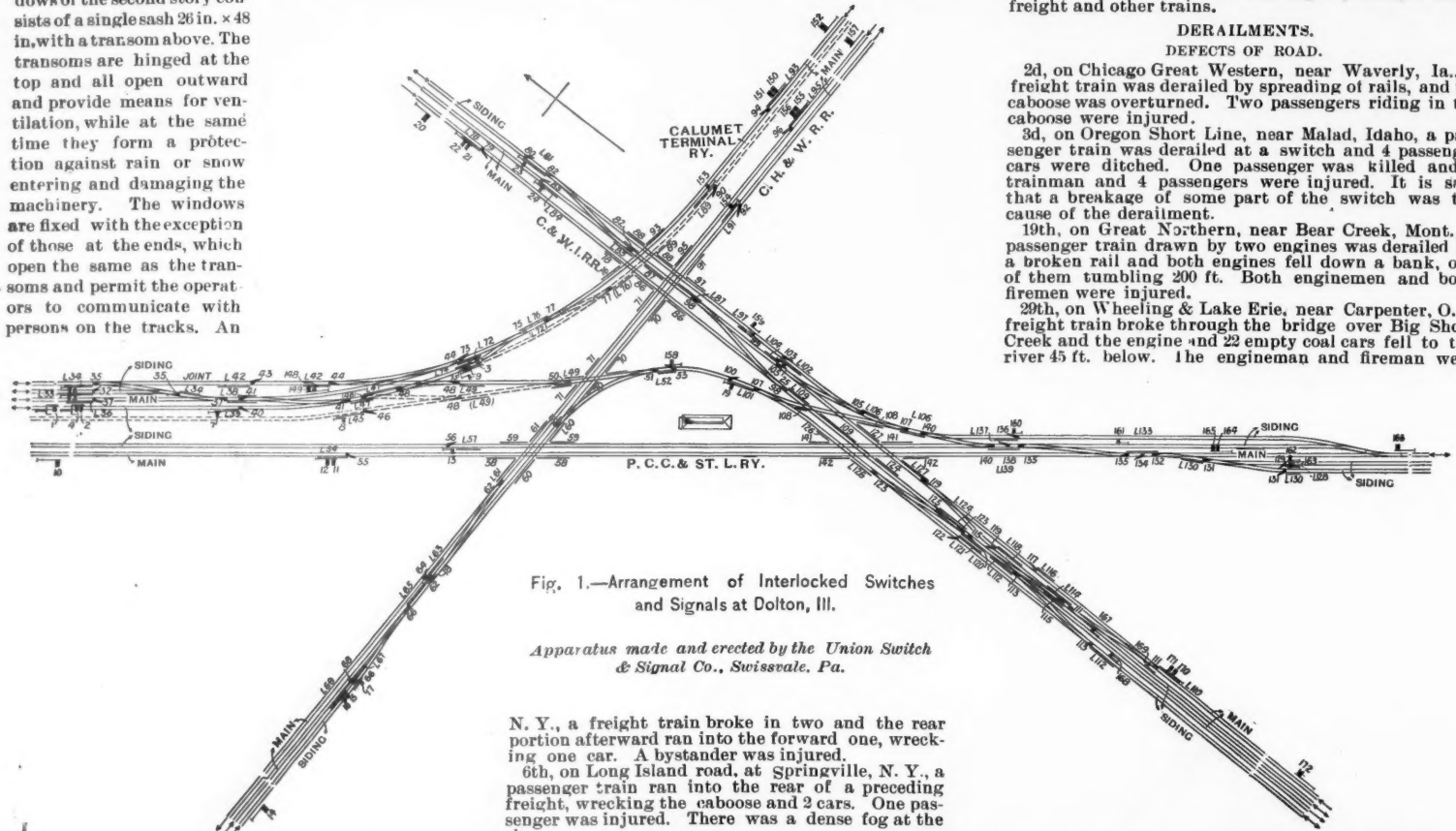


Fig. 1.—Arrangement of Interlocked Switches and Signals at Dolton, Ill.

Apparatus made and erected by the Union Switch & Signal Co., Swissvale, Pa.

N. Y., a freight train broke in two and the rear portion afterward ran into the forward one, wrecking one car. A bystander was injured.

6th, on Long Island road, at Springville, N. Y., a passenger train ran into the rear of a preceding freight, wrecking the caboose and 2 cars. One passenger was injured. There was a dense fog at the time.

9th, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Pittsburgh, Pa., a freight train broke in two and the rear portion afterward ran into the forward one, wrecking two cars, which fell over a precipice 30 ft. high and landed on the sidewalk in Carson street.

9th, on Pennsylvania road, at Lilly, Pa., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking 20 cars. A boy stealing a ride was injured.

12th, on Erie road, at Latimer, O., a freight train broke in two and the rear portion afterward ran into the forward one, ditching 8 cars. The fireman jumped off and was injured.

20th, on Lehigh Valley, at Newark, N. J., a freight train ran into the rear of a preceding freight, wrecking the caboose and one freight car. One employee was injured.

27th, on Erie road, at Middletown, N. Y., a freight train descending a grade broke in two and the rear portion afterward ran into the former one, wrecking 20 cars. A tramp was badly injured.

And 11 others on 11 roads, involving 16 freight and other trains.

**BUTTING.**

3d, 3 a. m., on Southern Pacific, near Langtry, Tex., butting collision of freight trains, making a bad wreck; 1 fireman was killed and 4 other trainmen were injured. It is said that a telegraph operator made a mistake in copying a train order.

8th, on New Jersey & New York, near Mt. Ivy, N. Y., collision between a passenger train and a work train, badly damaging both engines. One passenger was injured.

11th, on Southern Railway, at Harrisburgh, N. C., butting collision between northbound passenger train No. 36 and southbound passenger train No. 11, the former of which was running at high speed. Both engines and both express cars were wrecked and one of the latter caught fire, but by the use of chemicals the flames were soon extinguished. One postal clerk was burnt to death by being pinned down in contact with the boiler of one of the engines. One trainman and 1 tramp were

killed and one brakeman was injured. The bridge was a Warren truss 100 ft. long. It was a through bridge of six panels, the compression members being of timber and the tension members of steel. It was erected in 1889 by the Massillon Bridge Co., and inspected by the Pittsburgh Testing Laboratory. The cause of its failure has not been determined.

30th, on Illinois Central, at Boaz, Ky., a passenger train was derailed at a point where the track had been weakened by heavy rains, and one sleeping-car was overturned. Five passengers were injured.

And 4 others on 4 roads, involving 1 passenger train and 3 freight trains.

**DEFECTS OF EQUIPMENT.**

5th, on Pittsburgh, Fort Wayne & Chicago, at Allegheny City, Pa., a freight train was derailed on a high bridge by a broken axle, and the engine and several cars fell to the street, about 40 ft. below. The engineman and fireman were fatally injured. The bridge was a Howe truss.

14th, 11 p. m., on Lehigh Valley, at Epsay Run, Pa., a freight train was derailed by a broken wheel and several cars were wrecked. Two brakemen were injured.

15th, on Louisville & Nashville, near Pewee Valley, Ky., a car in a freight train broke down and, with two others, was derailed and wrecked. Oil in the cars took fire and the wreck was burned up. One brakeman was injured.

16th, on Baltimore & Ohio, at Cook's Mills, Pa., a freight train was derailed by a drawbar which was pulled out and fell upon the track, and a dozen cars of coal were badly damaged. Two boys trespassing on the cars were killed.

23d, on Central of New Jersey, at Raritan, N. J., a freight train was derailed by a broken axle and several cars were wrecked. A brakeman was injured.

And 15 others on 13 roads, involving 2 passenger and 13 freight and other trains.

**NEGLIGENCE IN OPERATING.**

12th, on San Antonio & Aransas Pass, near Kennedy, Tex., several cars of a stock train were derailed and

advantage gained by this construction is that the studing which forms the frame-work of the tower can be made continuous from top to bottom; and the view from the tower is always through but one pane of glass, and is not obstructed by the sash, as when sliding windows are in intermediate positions.

The room containing the levers is shown by Fig. 2. It is finished in beaded pine ceiling and has hard pine floors. There are in all 172 levers, 11 of which, as above stated, will not be used at present. Fifty-one levers operate 73 switches, 50 operate a similar number of signals and nine bolt locks, 51 work 73 facing point locks and 16 crossing bars, while nine levers are for 20 crossing bars, making in all 161 working levers. The numbers on the plan correspond in each case to the number of the lever which operates the particular signal or switch. There are no selectors used. All forward movements are governed by full size semaphores and back-up movements are governed by dwarf signals. All of the signals are connected to the machine by wires and the switches are connected by pipes.

Fig. 3 is from a photograph taken on the first floor of the tower, and shows the method of leading out. A special form of lead-out crank is used which differs from those previously employed. The pipe lines are 5 in. apart, center to center, coming from the machine, and leave the crank angle 2 1/4 in. center to center, which spacing is maintained until the switches are reached. The cranks are mounted on cast-iron three-way stands, so that each crank has its separate pin connection. To prevent interference, the pipe connected to the middle crank is straight, while the pipes to the upper and lower cranks are offset 2 in. There are also one and two-way



wrecked by a steer which got out of one of the cars and fell upon the track. The conductor was injured. And 3 others on 3 roads, involving 1 passenger train and 2 freights.

## UNFORESEEN OBSTRUCTIONS.

21st, on Louisville & Nashville, near Garland, Ala., the engine and first 3 cars of a passenger train were derailed and ditched. The engine-man and fireman were killed

## Supreme Court Decisions.

The Supreme Court of the United States on Monday last decided four railroad cases. The most important is that of the Interstate Commerce Commission vs. the Cincinnati, New Orleans & Texas Pacific, to compel compliance by that road with the order of the Commis-

preference to one against another; that no undue preference is given to one place against another, but that in all things that equality of right, which is the great purpose of the Interstate Commerce act, shall be secured to shippers."

Further on Judge Brewer said: "It is not to be supposed that Congress would ever authorize an administrative body to establish rates without inquiry and examination; to evolve, as it were, out of its own consciousness the satisfactory solution of the difficult problem of just and reasonable rates for all the various roads in the country. And, if it had intended to grant the power to establish rates, it would have said so in unmistakable terms. In this connection it must be borne in mind that the commission is not limited in its inquiry and action to cases in which a formal complaint has been made, but that under Section 13 it may institute inquiry on its own motion in the same manner and to the same effect as though complaint had been made."

Attention is also called to the fact that the law grants no power even to fix a maximum or minimum rate, and the conclusion is drawn that as Congress did not give the express power to the Commission, it did not intend to secure the same result indirectly by empowering that tribunal to determine what in reference to the past was reasonable and just, whether as maximum, minimum, or absolute, and then enable it to obtain from the courts a peremptory order that in the future the railroad companies should follow the rates thus determined to have been in the past reasonable and just.

A suit against the Savannah, Florida & Western, involving the same issues, was decided in the same way. Justice Harlan dissented in both cases.

The third case was that of C. S. Wight, Freight Traffic Manager of the Baltimore & Ohio, who was convicted in the lower court for violation of law, in paying a consignee in Pittsburgh a rebate of  $3\frac{1}{2}$  cents per 100 lbs., to allow for cartage of beer to his store. Another consignee complained of discrimination and the complaint was sustained. The Supreme Court affirms the decision of the lower court, under which Wight was fined \$1,000.

In the case of E. M. Parsons against the Chicago & North Western, for alleged discrimination on corn shipments, it is held that a rate of 21 cents from Iowa, on corn for the seaboard, and one of 11 cents from Nebraska, a longer distance, were not proved to be unreasonable. Parsons, indeed, made no such claim, but sought to enforce a penalty against the road for not properly publishing the rates. Complainant did not show that he had been injured by the alleged failure to properly publish the rate.

In the case of the Commission against the Detroit, Grand Haven & Milwaukee—the well-known Ionia (Mich.) free-cartage case—the decree of the court below is affirmed, thus reversing the decision of the Interstate Commerce Commission, which declared the free cartage illegal. The substance of the decision is that:

"The fourth section of the act has in view only the transportation of passengers and property by rail and that when the passengers and property reached and were discharged from the cars at the company's station at Grand Rapids for the same charges as those received for similar service at Ionia, the duties cast upon the company were fulfilled and satisfied. Justice Shiras said that it was competent for the Commission to direct by a general order that railroad companies should there after regard cartage and include it as such in their schedules. In that event, he says, such an order might be regarded as a reasonable exercise of the Commission's powers. But we are not persuaded that the defendant company has acted in any intentional disregard of the sixth section."

It has been predicted by the reporters for a week or two that the Supreme Court would this week decide the long-pending case in which it was sought to enforce the maximum freight rate law of Nebraska, passed by the

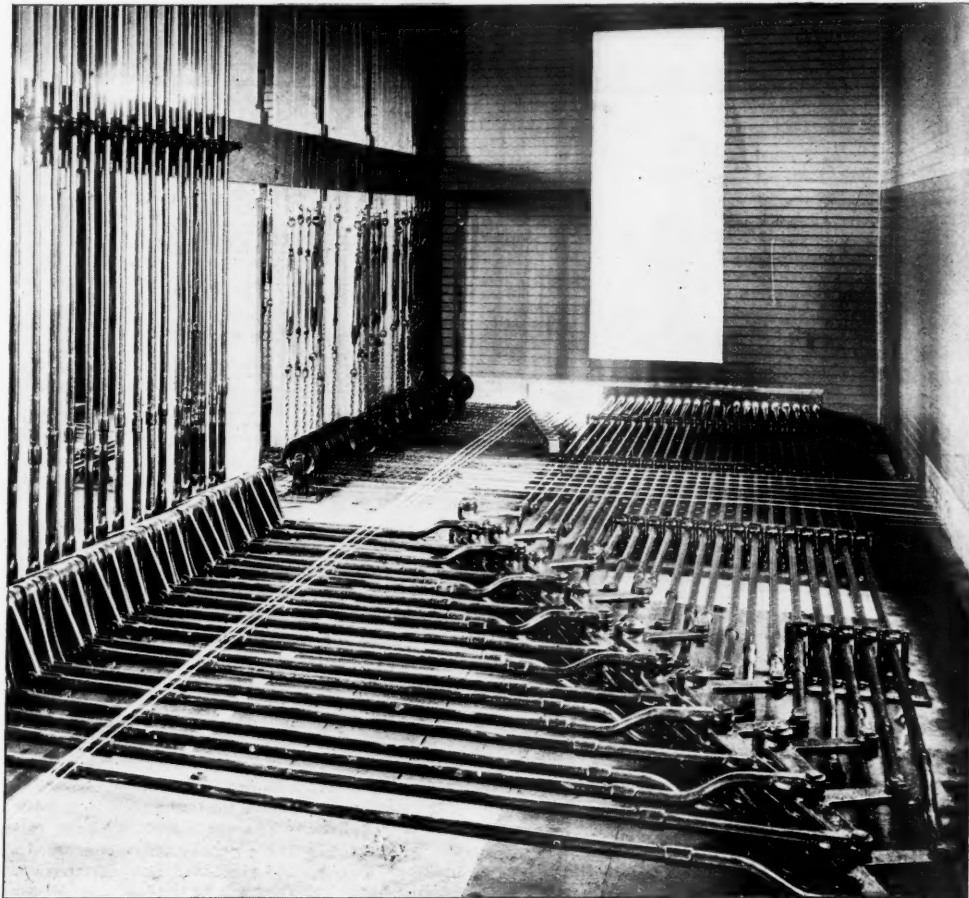


Fig. 3.—Dolton Signal Cabin—Lead-out Connections.

and one trainman and 4 tramps injured. The derailment was close to a trestle bridge, and it is said that a rail had been maliciously displaced.

27th, 4 a. m., on Houston & Texas Central, at Fairbanks, Tex., a passenger train was derailed and most of the cars were ditched. One passenger was killed and 11 passengers and 1 trainman were injured. It is said that the derailment was due to the malicious displacement of a rail.

And 2 others on 2 roads, involving 1 passenger train and 1 freight.

## UNEXPLAINED.

2d, on Florence & Cripple Creek, at Cripple Creek, Col., the rear car of a passenger train was derailed and overturned: 1 brakeman and 4 passengers injured.

7th, 4 a. m., on Cape Fear & Yadkin Valley, near Pilot Mountain, N. C., a freight train was derailed and the engine fell down a bank. The conductor and fireman were killed and the engine-man badly scalded.

13th, on Pennsylvania road, near Nescopeck, Pa., a passenger train was derailed, the engine and baggage car were wrecked and the first passenger car badly damaged. The fireman was injured. The engine-man refused a purse which was made up for him by the passengers.

19th, on Baltimore & Ohio, near Briggsdale, O., a passenger train was derailed and the engine-man was injured.

23d, on Columbus, Sandusky & Hocking, near Hemlock, O., a freight train was derailed and the engine fell down a bank. The fireman was killed.

25th, on Iowa Central, near Steamboat Rock, Ia., the engine of a freight train was derailed and overturned, and the engine-man, fireman and one trainman were badly injured.

25th, on Southern Railway, near Blacksburg, S. C., passenger train No. 38 was derailed and the engine-man and fireman were injured.

28th, on New York, Ontario & Western, near Fish's Eddy, N. Y., a freight train broke through a bridge and 7 cars fell to the river below. The cause of the failure of the bridge has not been certainly ascertained, but there are evidences that a car in the middle of the train jumped the track and knocked down the end post of the middle truss of the bridge. This accident was described in the *Railroad Gazette* of May 7.

And 18 others on 18 roads, involving 4 passenger and 14 freight and other trains.

## OTHER ACCIDENTS.

8th, on Cleveland, Cincinnati, Chicago & St. Louis, near Indianapolis, Ind., a car of whiskey in a freight train exploded, apparently having taken fire from a hot box, and 14 cars were burned up. A tramp sleeping in one of the cars was badly burned.

11th, on Grand Trunk, near Stratford, N. H., the cab of the locomotive of a freight train was burned, and many of the fixtures within it melted, by the flames from the firebox, which were driven out in consequence of a stoppage in the smokebox due to the falling down of the deflector sheet. The engine-man, in attempting to shut off steam, was badly burned.

16th, on Cleveland, Cincinnati, Chicago & St. Louis, at Osborn, O., the locomotive of a freight train was wrecked by the explosion of its boiler. Three trainmen were injured, one of them fatally.

And 3 others on 3 roads, involving 1 passenger train and 2 freights.

A summary will be found in another column.

sion reducing freight rates from Chicago to Southern cities. The opinion is by Justice Brewer. The full decision is not given out, but the telegraphic reports taking up what is the main question of general interest—the power of the Commission to prescribe rates—say that the gist of the opinion is that:

"Under the Interstate Commerce act the Commission has no power to prescribe the tariff of rates which shall control in the future, and therefore cannot invoke a judgment in mandamus from the courts to enforce any such tariff by it prescribed." . . . "Has the Interstate Commerce Commission power to fix rates? We do not find any provision of the act that expressly or by necessary implication, confers such a power. The Commission has most important duties.

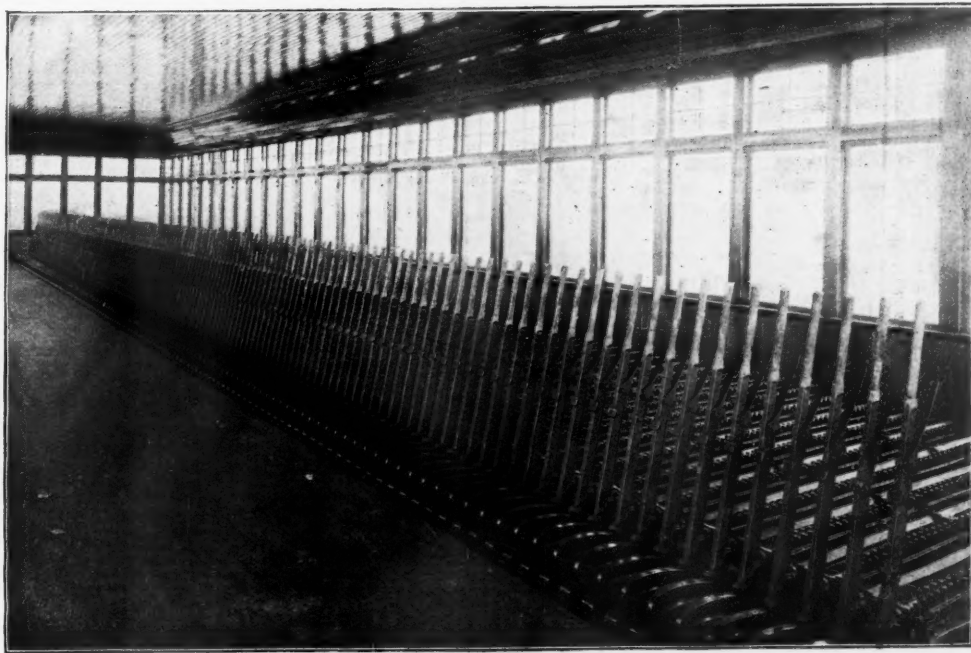


Fig. 2—Interior of Dolton Signal Cabin.

It is charged with the general duty of inquiring as to the management of the business of railroad companies, and has the right to compel full and complete information as to the manner in which such companies are transacting their business. And with this information it is charged with the duty of seeing that there is no violation of the long and short haul clause; that there is no discrimination between individual shippers, and that nothing is done by rebate or otherwise to give

Legislature of that state in 1893; the rumor being that the decision would be against the State. But no decision was issued and the court has now adjourned until October. It is said that, when decisions thus leak out beforehand, the subsequent omission of the courts to publish them generally indicates that the rumors were well founded.



## Judicial Decisions.

The Missouri Court of Appeals has decided that bicycles are not baggage. A passenger whose application to have his bicycle carried in a baggage car of the Missouri Pacific was refused, brought suit to compel the road to carry it, and won his case in the lower court, but the railroad appealed and the higher court says that baggage consists of trunks, satchels, etc., and their contents, and that the contents must be a traveler's necessary articles. A bicycle has no utility on the trip; it may be convenient and useful at the end of the trip, but this would be true of any other kind of vehicle: a carriage, for instance. Moreover, the fact that the bicycle was delivered not crated or otherwise protected excluded it from the right to be classed as baggage.

A press dispatch of May 22 says that the Supreme Court of Iowa has decided that maximum freight rates fixed by the State Railroad Commissioners are not necessarily to be assumed to be reasonable, and that in the event unreasonable rates are charged, even if it be shown that they are the Commissioners' rates, the shipper who is overcharged may recover damages in triple the amount of the overcharge. The case is that of J. A. Barris & Co. vs. the Chicago, Burlington & Quincy. Barris & Co., of Council Bluffs, shipped large quantities of sand to Creston, prior to July 20, 1893. On that date the Commissioners, after a hearing, decided that the old rate on sand, although it was the Commissioners' rate, was excessive and prohibitive. A lower rate was put in, and Barris & Co. sued to recover the difference between the old excessive rate and the new one. The lower court held that, the rate being the Commissioners' schedule, there could be no recovery.

The Supreme Court reverses this. It holds that the Commissioners' rates are only prima facie reasonable, and that if it can be shown by evidence that the rates are in fact excessive, the shipper may recover. Barris & Co. showed that on their shipments the difference between the rates they paid and the reasonable rate established after the hearing was \$313.38. The Supreme Court declares that they are entitled to recover in three times this sum.

The Commissioners say the decision merely sustains the action of the Legislature in refusing to give the Commission power to absolutely fix rates. The power to fix maximums was given instead.

Judge Adams, of Chicago, has decided, in the suit of the Manhattan Cement Co. against the city of Chicago, to recover the value of merchandise in cars destroyed in the Debs riots of 1894, that the city is responsible for three-quarters the amount of damage wrought by mobs of 12 or more persons. The opinion is brief, being confined to a discussion of the constitutionality of the law of 1887, which is upheld.

## Brooklyn Tower Foundations of the New East River Bridge.

The work to be done on the foundations at the Brooklyn end of the New East River Bridge consists of building two stone masonry piers on timber caissons, similar to those contracted for, and now building, on the New York side of the river. They will be placed 97½ ft. center to center, and will be situated between South Fifth

clay varying from 6 to 33 ft. in thickness. This again is covered with sand containing an occasional boulder, and varying from 11 to 31½ ft. in depth. As the result of the borings, the datum plane for the south pier was fixed at 82 ft. below mean high water, and that for the north pier at 96 ft. below the same mark.

The piers will be as shown in Fig. 1, and they will rest

lead or other approved material. All outer seams of the 12 × 12-in. horizontal wall timbers, and also all joints of chamber lining planks will be thoroughly caulked with oakum and served with pitch. Besides the usual caulking and pitching, the interior walls and surfaces of the working chamber are to be thoroughly coated with paint.

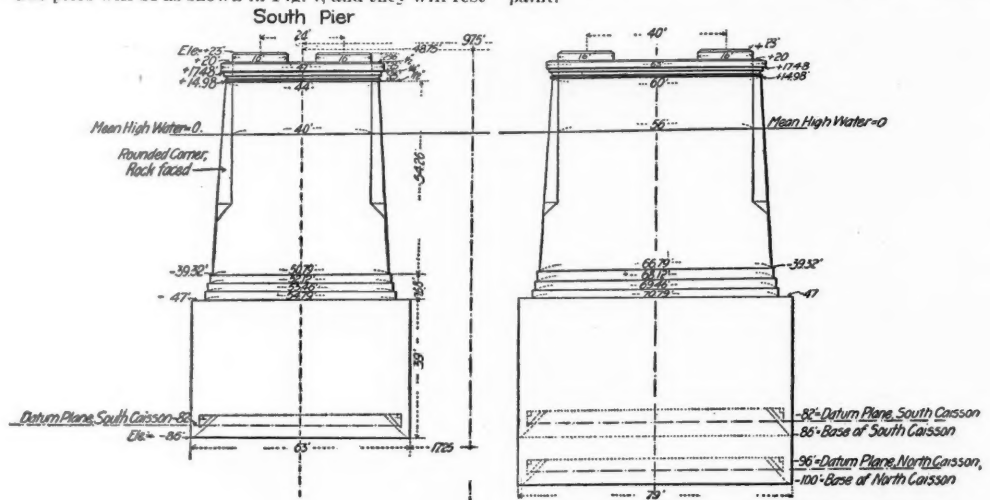


Fig. 1.—Plan and Elevations of Tower Foundations for New East River Bridge.

Each caisson will have a cofferdam, which, in each case, will be 50 ft. high, made in three sections. The material of the cofferdams will be the same as that of the caissons, and the structures will be built as shown in Fig. 5. Each corner of each section of cofferdam will be tightened by three pairs of Z iron tighteners wedged in place with wooden wedges. The horizontal joints at the base of each section will be covered by seam-boards after caulking and serving with pitch, also the vertical corner joints. The cofferdam will be fastened to the caisson by the device shown in Fig. 6.

In building the caissons the timber and iron work will first be completed to a height of 30 ft., then the caissons will be launched and their construction continued while floating. The caissons when launched will thus contain approximately 35,600 cu. ft. of timber and 54 tons of iron, and will weigh approximately 945 tons, and will draw, without false bottom, about 11.4 ft.

The caisson for the south pier will be 39 ft. high when completed, and will contain approximately 58,800 cu. ft. of timber and 86 tons of iron, and weigh (before the addition of any concrete) approximately 1,557 tons, and draw 15.3 ft. The depth of water at site of pier is now about 58 ft. at high water, and it is assumed that it may be increased to 60 ft. by the scour of the tide as the caisson approaches the sand-bottom of the river. A cofferdam 25 ft. high is necessary to safely land the pier on the river bottom, and the cofferdam is increased to a total height of 50 ft. to allow sinking to proceed independently

on caissons sunk by the plenum-pneumatic process. Each caisson will measure 63 ft. × 79 ft. in plan, and will be of such a height that when it is in position its top will be about 47 ft. below mean high water. From the nature of the bottom, in order to fulfill this requirement, the caisson for the south pier foundation will be 39 ft. high, and that for the north pier 53 ft. The Engineer's specifications require that the caissons shall be built of good, sound, long-leaf Southern pine, the timber to be carefully framed and fastened by drift and screw bolts. The Engineer's plans give the framing and other parts of construction as shown in Figs. 2 and 3, a detail of the cutting edge being shown in Fig. 4. The working chamber of each caisson will be divided into three compartments by trans-

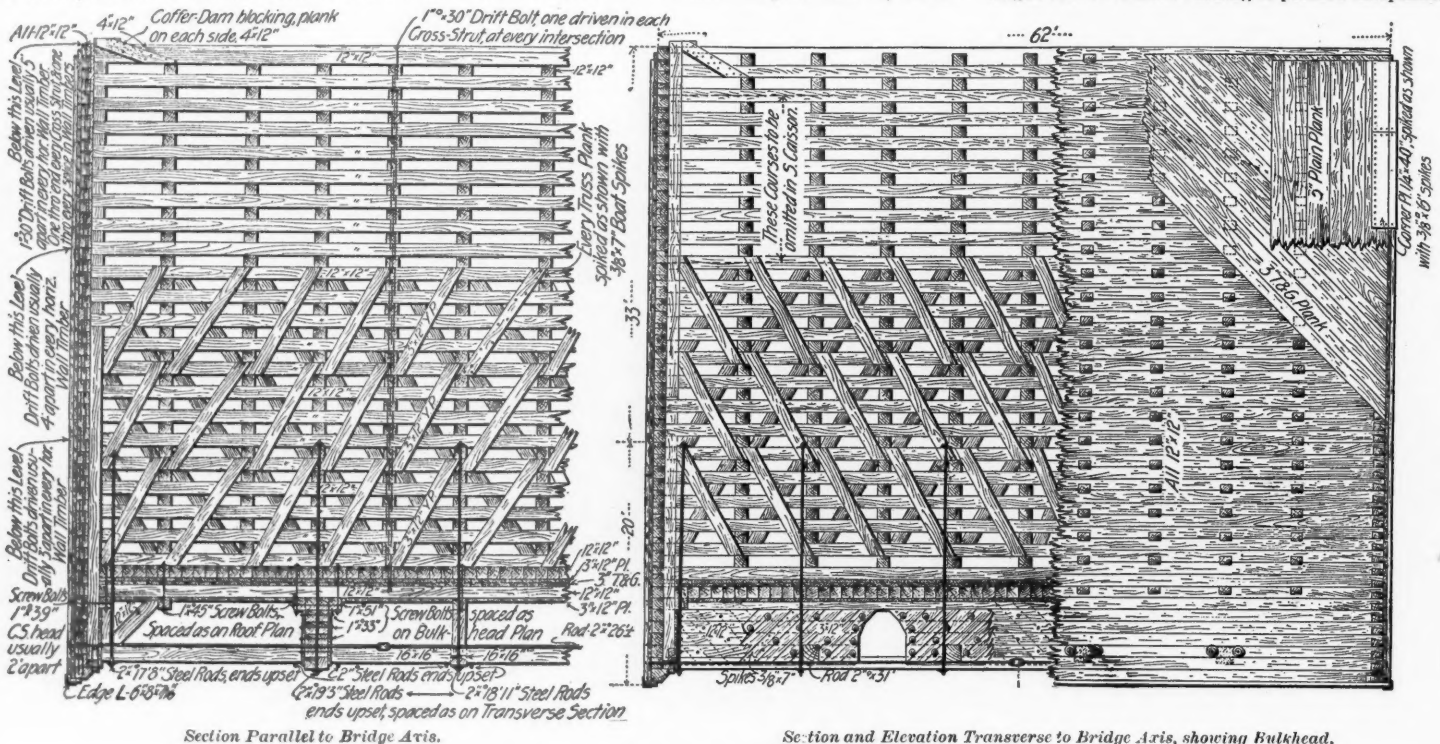


Fig. 2.—Details of Caisson for the North Pier of the Brooklyn Tower of the New East River Bridge

and South Sixth streets, and just within the government pier head line.

Borings made with a diamond drill in the immediate neighborhood of the piers indicate that rock is reached at depths varying from 76 to 105 ft. below mean high water, being lowest in the vicinity of the north pier. The rock at these several points is overlaid with a stratum of

verse bulkheads. The lower course of the deck is laid perpendicular to the bridge axis; the next two are laid at right angles to one another and at 45 degrees to the lower, the top course being laid parallel to the axis of the bridge. The tongued and grooved planking in the lower roof course, and in the inner sheathing course, will be put on with tongue and groove wet with white

of, and without waiting for, the construction of the masonry; and also to make it easy to keep the pressure on the cutting edge under perfect control during the sinking. The weight of timber and iron in the 39-ft. caisson, surmounted by 25 ft. of the cofferdam, is approximately 1,960 tons, and draft of water without concrete is about 17.9 ft.



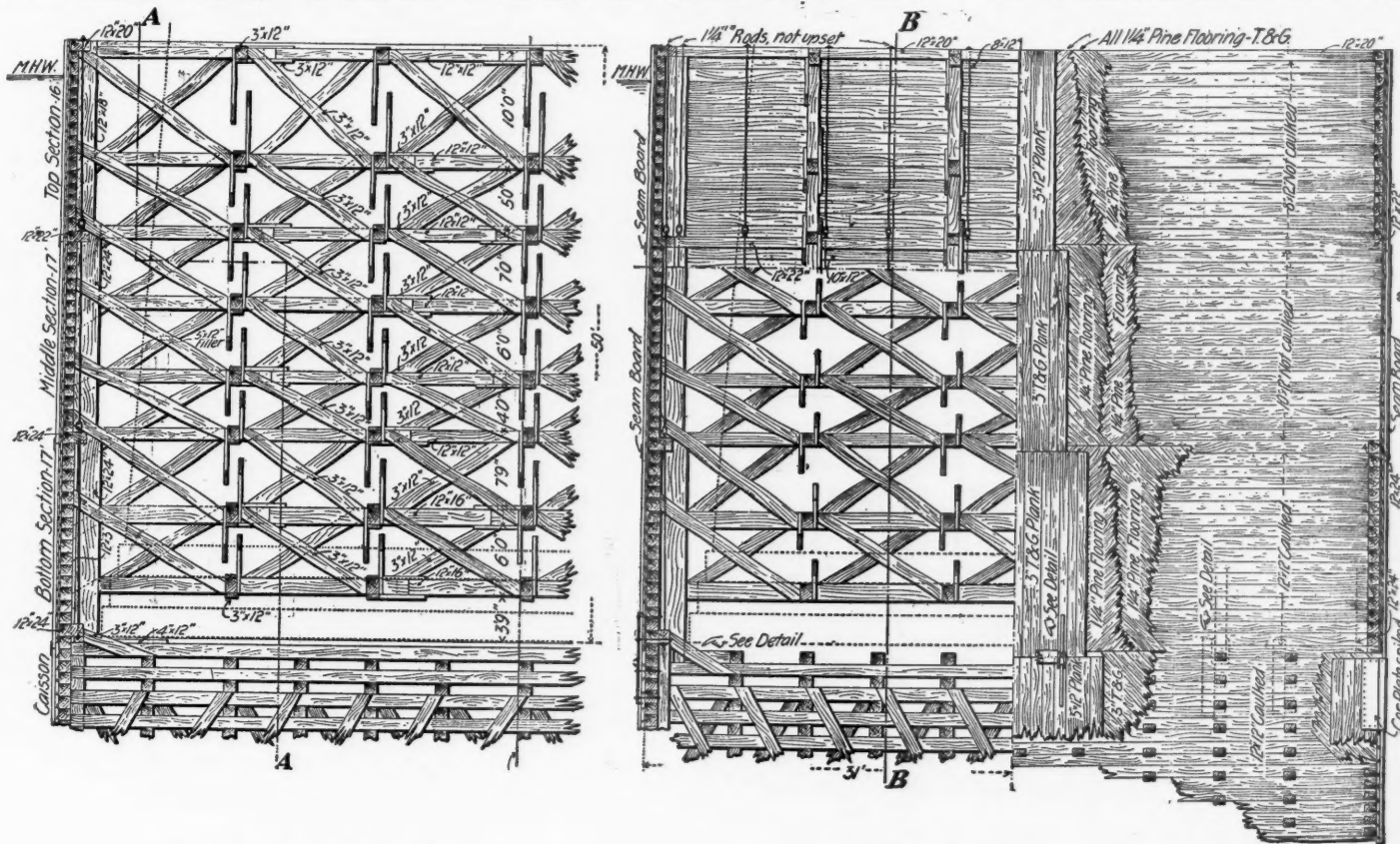
The caisson for the north pier will be 53 ft. high when completed, and will contain approximately 74,700 cu. ft. of timber and 98 tons of iron, and weigh (without concrete, approximately 1,905 tons and draw about 17.9 ft. of water. The caisson is surmounted by a 50-ft. high cofferdam for same reasons as for south pier, though only 11 ft. of cofferdam is necessary to land this pier on

above. To sink the pier through clay and rock to its final position, 100 ft. below high water, will require the weight of all the balance of the concrete and of approximately 2,300 cu. yds. of stone masonry. About 3,300 cu. yds. more stone masonry is required to bring the pier up to high-water level. The balance of the stone masonry, between high-water level and its finish 23 ft. above, is

The object in view was to test them as nearly as possible under the same conditions as in actual service, when used in staying the firebox of a locomotive, and particularly to note the relative decrease of the holding power at high temperatures.

In all these tests, it is assumed that the bolts are spaced 4 x 4 in., center to center, supporting an area of 16 sq. in.

The total stress which each one would be required to



Section B-B, Parallel to Bridge Axis.

Section A-A and Elevation Transverse to Bridge Axis.

Fig 5.—Details of Cofferdam for Either Pier of the Brooklyn Tower.

river bottom safely in the assumed 60 ft. of water. Should the south pier be sunk first, it is probable that there will be no scour at north pier, and that the depth of the water will be much less than 60 ft. The weight of timber and iron in 53-ft. caisson, surmounted by 11 ft. of cofferdam, is approximately 2,140 tons, and the draft of water, without concrete, about 19.1 ft.

Each caisson will be sunk to the depth shown in Fig. 1, or to such depth as shall be required to form a firm and sufficient foundation for the towers. The bedrock will be cleaned off for the whole area of the caisson, and unsound rock removed until rock of a sound and good character is laid bare. The working chamber of each caisson will be filled with concrete made of broken limestone or trap-rock, of sizes from 1/4 in., smallest, to 2 in. in largest dimension, and Portland cement and sand. The broken stone, after being washed, will be mixed with the cement mortar by machine. For a depth of 6 in. under the shoulder of the cutting edge, and for the same depth under all cross-beams and cross-walls and under the roof of the chamber, a mortar made of Portland cement and sand shall be used instead of concrete, which mortar must be rammed hard into place.

To land the south pier on the river bottom about 3,200 yds. of concrete will be needed, and this concrete, in order to render the caisson above roof more watertight, and to keep the weight as long as possible off the middle of the roof, and over the cutting edge, may be required to be so placed on the roof and around the sides as to leave a central well, to be afterward filled with the balance of the concrete, about 860 cu. yds. To sink the pier

ft. below high water, will require the balance of the concrete and about 600 cu. yds. of stone masonry. To sink the pier through clay and rock to final position, at 86 ft. below high water, will require the weight of about 4,000 cu. yds. of stone masonry in addition to the 600 cu. yds. above. About 1,000 cu. yds. more stone masonry is needed to bring the pier up to high-water level, and about 2,155 more to bring it up to its finish, 23 ft. above high water, or a total of 7,755 cu. yds. A portion of the cutting edge in its final position will be about 2 ft. above the rock. All clay must be removed from above rock within the outer horizontal lines of the cutting edge, and rock may be required to be worked into rough horizontal steps.

To land the north pier on the river bottom, in the assumed depth of 60 ft. of water, about 3,100 cu. yds. of concrete will be needed. This may be placed as described for south pier, leaving a central well, to be afterward filled with the balance of the concrete, about 2,940 cu. yds. To sink the pier through sand to clay, 73 ft. below high water, will require the weight of about 1,500 cu. yds. of concrete in addition to the 3,100 cu. yds.

about 2,155 cu. yds. As in the south pier, a portion of the cutting edge in its final position will be about 4 ft. above the rock, and all clay must be removed from above the rock within the outer horizontal lines of the cutting edge, and rock may be required to be worked into rough horizontal steps.

The approximate quantities in each pier are as follows:

	South pier.	North pier.
Caisson—		
Timber.....	58,800 cu. ft.	74,700 cu. ft.
Iron.....	86 tons.	98 tons.
Concrete, above roof..	4,060 cu. yds.	6,040 cu. yds.
below.....	1,080 "	1,205 "
Stone masonry.....	7,755 "	7,755 "
Sand.....	3,400 "	4,000 "
Clay.....	2,230 "	4,170 "
Rock.....	290 "	940 "

The approximate quantities in one cofferdam, both of which are alike, and will be removed after the piers are finished, are:

Bottom section, 17 ft. high.	11,130 cu. ft. timber.
Middle " 17 " "	14 tons iron.
Top " 16 " "	10,000 cu. ft. timber.
	19 tons iron.
	7,900 cu. ft. timber.
	8 1/2 tons iron.

The stone for the masonry of the piers must be of granite throughout, unless the Commissioners permit the use of limestone for face work below a horizontal plane four feet below low water and for backing below the molding courses under the copings. The face stones of the upper coping course will be doweled to those of the course next below with 1 1/2-in. steel dowels extending 6 in. into the courses.

The cement used will be a brand of Portland, and must undergo the following tests: Briquettes of neat cement, exposed to the air for 24 hours and immersed in water for 6 days, must have a tensile strength of at least 350 lbs. per square inch.

Briquettes mixed of one part of cement to two parts of dry sand by weight, exposed to the air for 24 hours and immersed in water for 6 days, must have a tensile strength of at least 150 lbs. per square inch.

Pats of neat cement set in air and then immersed in water must show no checks or cracks.

Bids on this proposed work will be based upon excavation to the datum planes indicated in Fig. 1. In case the contractor is required to excavate below these planes, or do any work below them, such work will be paid for by the cubic yard of completed work in place.

Bids for the whole foundation work are now being asked by the Commissioners, and will be received by them on June 9 next.

#### Experiments in Boiler Bracing.\*

BY FRANCIS J. COLE.

The following investigation into the holding power at different temperatures, of various styles of locomotive firebox crown stays was made by the writer for a prominent railroad company. The results are thought to be of sufficient interest to present to this society.

\*Presented at the Hartford meeting of the American Society of Mechanical Engineers, May 25-28, 1897.

sustain, due to the pressure of the steam, would be this area multiplied by the maximum boiler pressure.

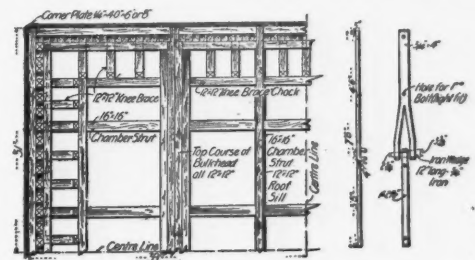
At 150 lbs. steam pressure =	2,400 lbs.
" 160 " " " =	2,560 "
" 170 " " " =	2,720 "
" 180 " " " =	2,880 "
" 190 " " " =	3,040 "
" 200 " " " =	3,200 "

The pocketing or bagging down, which is characteristic of an overheated crown-sheet caused by low water was imitated by using a bearing plate of 1/2-in. steel, 8x8 in. square, with a hole 4 1/2 in. in diameter bored through its center. The area of this hole is 15.9 sq. in. The specimens were screwed or driven into pieces of 3/4-in. steel plate, 12x12 in. square.

A 100,000-lb. Riehle screw testing machine was used, the specimen plate and bolt being inverted, with the bearing plate between it and the head of the machine, the staybolt hanging down through the middle. Sixteen different styles of crown stays were made, specimens numbered 1 to 16—6 test pieces, each of 1 to 4; and 4 pieces, each 5 to 16, numbered 1 to 76.

These specimens represent the ordinary forms most commonly in use and other styles which suggested themselves. The material used was 1-in. round mild steel of 58,390 lbs. ultimate tensile strength, with an elastic limit of 38,900 lbs., and an elongation of 30.25 per cent. in 8 in. The only exceptions to this were tests No. 2, specimen 6, and No. 70, specimen 16, which after fracture showed unmistakably to have been made of iron.

The 3/4-in. steel sheets, 12x12 in. (a few of the first were 6x6 in.) square, into which the bolts were screwed, were mostly cut from one large sheet, having lengthwise an ultimate tensile strength of 59,150 lbs., elastic limit of 28,800 lbs., with an elongation of 31.75 per cent. in 4 in., and crosswise an ultimate tensile strength of



Figs 3 and 6.—Plan of Working Chamber and Detail of Irons for Anchoring Cofferdam to Caisson.

58,400 lbs., elastic limit of 28,040 lbs., with an elongation of 28 per cent in 4 in., both ways showing a silky fracture.

The specimens were heated in a small portable forge, alongside the testing machine. The plates, with the bolts projecting upward, were placed on the fire, and heat localized in the center over a diameter of about 6 in., by keeping a small, bright fire, and dampening the outside with fine, wet coal, to keep it from spreading.

In this method of heating the head or nut would be hotter than the rest of the sheet, imitating in a measure the conditions which are present in a locomotive firebox. In all the hot tests the sheets were heated to a bright red, but in the first tests, Nos. 1-22, owing to the slow speed of the machine and the time consumed in centering the specimen, the fracture did not take place until some of them were almost black; in the tests after No. 22 the speed was very much quicker, and arrangements



were made for centering the specimens very rapidly. Evidently the temperature at parting is the correct one upon which to base the holding power of the bolts.

Regarding the holding power of staybolts screwed through  $\frac{3}{8}$ -in. plate and riveted over, as shown in specimens 1 to 4, and 15, it will be observed that the average holding power when cold is 16,350 lbs. for the worst and 24,000 for the best; and when hot, 3,470 lbs. for the worst and 4,613 lbs. for the best. This would indicate that the best riveted head which can be formed cold, made in the usual conical shape, has a holding power, hot and cold, very much less than the worst form of bolt with solid head, even when picked or grooved deeply under the head, or bolt screwed through with a nut on under side of sheet. It does not appear that the solid buttonhead bolts are deficient in holding power when tested in this manner, but the principal objection to their use is the liability of injury when screwed into a firebox where the holes are not tapped at right angles to the sheet and where the surface of the sheet is curved. This objection can easily be removed by properly seating the head. It is the regular practice of the locomotive company with which the writer is connected to use a seating tool, which faces off the underside of the sheet exactly at right angles to the longitudinal axis of the bolt. This not only insures a much tighter fit, but guarantees absolutely against any bending of the head when screwing it close up to the crown sheet.

The holding power of the staybolt when provided with a nut is considerably increased when red hot by countersinking the nut and well riveting the bolt into the same, as shown in specimen No. 14.

The characteristic failure of the bolts when screwed through and riveted over was by the sheet bagging down, stretching out the threads to a bell-mouth shape, and shearing off a small annular ring, representing the thickness of the riveting. It will be observed, when referring to specimens 1 to 4 and 15, that the edges of the head are very shallow where they are sheared off in line with the edge of hole, and that the holes are stretched to such an extent that the threads lost their holding power. Generally speaking, the use of a nut increases the holding power of the staybolt over the plain riveting, when tested cold, about 100 per cent., and 50 per cent. when heated to a bright red.

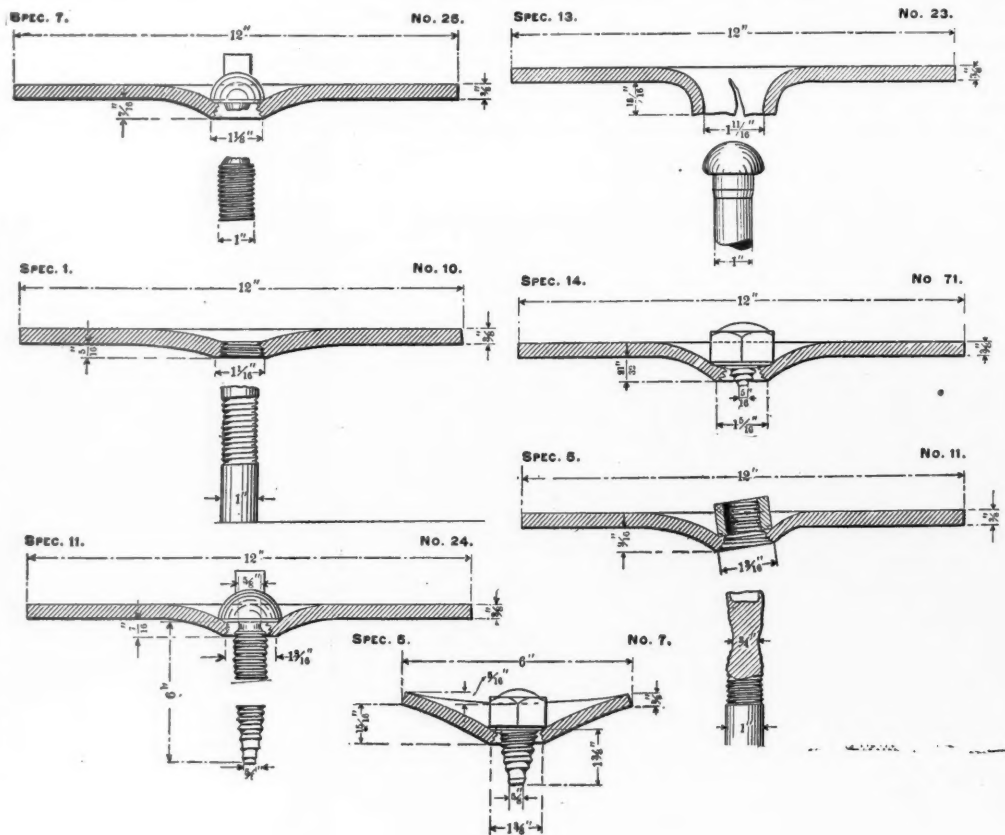
One of the most noticeable features shown in these tests is the comparatively slight decrease in the holding power of any of the forms of crown stays until a temperature exceeding a black or dull red has been reached. This is especially so in the case of test No. 14, specimen No. 1, which at a dull red showed a strength of 14,800 lbs., and the average strength of the same, when cold was 16,350 lbs. The results of the tests would seem to support the statement that the average holding power of the usual form of staybolt at a dull red or almost black heat would be decreased from its strength cold about 50 per cent., and at a bright red decreased to about one-fifth of its original strength, except in specimens 11, 12, 13 and 16, which are decreased to about one-fourth of their original strength. In the case of specimens 13 and 16, their holding power would be very much increased by the use of a thicker crown sheet, as they mostly failed, both hot and cold, by the head pulling through the sheet.

The average of the tests in which those of lower temperature and doubtful results are not considered, is as follows:

Spec. No.	Tensile Cold.	Strength Hot.	Remarks.
1	16,350	3,470	Head $\frac{3}{8}$ in. above sheet, riveted just enough to make steam-tight; head not to exceed $\frac{1}{2}$ in. diameter.
2	16,700	3,473	Head $\frac{3}{8}$ in. above sheet, riveted over.
3	17,600	4,040	Head $\frac{3}{8}$ in. above sheet, riveted over.
4	20,733	4,000	Head $\frac{3}{8}$ in. above sheet, riveted over.
5	41,950		$\frac{3}{8}$ -in. standard nut tapped out to 1 in. 12 threads, and riveted over; project about $\frac{1}{8}$ in. to $\frac{1}{2}$ in.
6	42,000	6,000	1-in. standard nut, 12 threads, riveted over; project about $\frac{1}{8}$ in. to $\frac{1}{2}$ in.
7	38,120	7,695	Button head, $\frac{3}{8}$ -in. groove.
8	39,800	6,933	Button head, $\frac{1}{2}$ -in. groove.
9	39,800	7,500	Button head, $\frac{3}{8}$ -in. groove.
10	39,800	7,433	Button head, $\frac{1}{2}$ -in. groove.
11	39,800	8,766	Button head, no groove, countersunk.
12	42,580	9,333	Button head, no groove, $\frac{3}{8}$ -in. copper washer.
13	43,100	10,150	Button head, with $1\frac{1}{2}$ -in. reamed hole.
14	39,720	7,816	1 in. standard nut, 12 threads, nut countersunk $\frac{3}{8}$ in. and well riveted over.
15	24,000	4,613	Screwed in sheet, 12 threads, rivet head $\frac{3}{8}$ in. high and $\frac{1}{2}$ in. diameter; largest head which can be formed.
16	40,300	9,730	Button head, with $1\frac{1}{2}$ -in. tapered reamed hole, 3 in. thimble and nut.

Complete Records of Tests of Crown Stays.

Specimen No.	Test No.	Elastic Limit.	Tensile Strength.	Time Seconds.	Remarks.
1	4	Lbs.	Lbs.		
1	10	11,600	16,500		Cold 6-in. plate; pulled through sheet.
1	14	11,000	14,800		Cold.
1	57		3,500	13	Dull red; scarcely perceptible; almost black after parting.
1	58		3,440	11	Cherry red; not quite as hot as No. 36; pulled through sheet.
1	66				Bright red after parting; pulled through sheet.
1	68	10,500	16,200		6-in. plate; cold; pulled through sheet.
2	6	12,400	16,700		Cold 6 in. plate.
18			6,300		Red.
19			6,300		Red.
41			3,450	13	Bright red; 6-in. plate.
55			3,400	10	Bright red; pulled through sheet.
56			3,570	10	Bright red after parting; pulled through sheet.
3	3	12,000	17,600		Cold 6-in. plate.
3	17		9,300		Dull red after parting.
3	20		5,700		Cherry red.
3	40		3,850	13	6-in. plate; very bright red.
3	53		4,300	12	Bright red; pulled through sheet.
3	54		3,970	13	Bright red after parting; pulled through sheet.
4	5	12,300	19,100		Cold 6-in. plate.
4	8	16,000	22,300		Almost black after parting.
4	12	6,800	8,900		6-in. plate; cold.
4	22	14,000	20,800		Cherry red, not quite as hot as No. 58; pulled through sheet.
4	50		4,200	16	
4	60		3,800	17	Bright red after parting; pulled through sheet.
5	7	28,000	43,100		Cold 6 in. plate.



Diagrams with Mr. Cole's Paper on Boiler Bracing.

Specimen No.	Test No.	Elastic Limit.	Tensile Strength.	Time Seconds.	Remarks.
5	11	14,500	21,500		Dull red; almost black after parting.
5	15	12,900	23,300		Dull red; almost black after parting.
5	21		40,800		Cold 6-in. plate.
6	1	26,500	42,000		Cold 6-in. plate.
6	2	24,000	32,200		Cold 6-in. plate iron.
6	13	12,000	17,400		Dull red after parting.
6	16		6,000		Plate red; nut bright red.
7	25	22,000	39,240		Cold, broke in nick.
7	29		7,850	15	Bright red; parted while bright red, same as No. 28.
7	38		6,340	16	Bright red; broke in nick.
7	47	22,000	37,000		Cold; parted in nick.
8	32		7,700	10	Bright red; broke in nick.
8	33		6,400	12	Bright red; broke in nick.
8	34		6,700	16	Bright red; parted in nick.
8	52	26,000	39,800		Cold, parted midway, 6 in. from lower end.
9	42		6,630	23	Bright red; parted in nick.
9	43		7,500	23	Bright red; parted at first thread.
9	44		7,770	20	Bright red; parted in nick.
9	45		8,100	24	Bright red; parted in nick.
10	46		7,700	25	Bright red; parted in first thread.
10	49		7,500	18	Bright red; parted in first thread.
10	50	26,800	39,800		Cold; parted in center, $7\frac{3}{4}$ in. down.
10	51		7,250	22	Bright red; parted in first thread.
11	24	27,000	39,800		Cold; broke in bolt midway.
11	28		8,000	20	Bright red; parted while bright red; if anything a little hotter than No. 27.
11	36		9,400	18	Bright red; broke in first thread below nick.
11	39		8,900	21	Bright red.
12	30		10,000	18	Bright red; parted while bright red.
12	31		9,200	19	Bright red; parted while bright red.
12	37		8,800	19	Bright red; broke in first thread below nick.
12	48	28,300	42,580		Cold; parted 3 in. from lower end.
13	23	32,500	43,100		Cold; pulled head through sheet.
13	26	7,000	26,000		Slow speed; red, head bright red.
13	27		9,700	20	Bright red; faster speed than No. 26; parted while bright red.
13	35		10,600	24	Bright red; pulled through sheet.
14	67	19,000	39,720		Pulled cold; bolt broke.
14	71		7,560	18	Bright red after parting.
15	72		7,800	28	Bright red; red after parting; stripped in nut.
14	73		8,000	23	Bright red after parting; bolt broke between nut and sheet; nut split slightly on one side and riveting pulled in flush with top of nut.
15	61	17,000	24,000		Pulled cold; pulled through sheet, head sheared.
15	63		4,450	25	Bright red after parting; pulled through sheet.
15	64		4,900	23	Bright red; red after parting; pulled through sheet.
15	65		4,500	13	Bright red after parting; pulled through sheet.
16	62	22,300	40,300		Pulled cold; bolt broke, 7 in. from plate.
16	68		9,660	17	Bright red after parting; pulled through sheet.
16	69		9,800	29	Bright red after parting; pulled through sheet.
16	70		6,630	14	Bright red after parting; bolt broke; found to be iron.

The conclusions of the writer are:

(a) That the center rows (5 to 10, according to the size of boiler) of the crown stays should be provided with solid button heads like No. 11, or with nuts like No. 14, to prevent pulling through in case the crown sheet is overheated.

(b) Grooving or cutting out the first thread under the head should be avoided. It not only weakens the bolt in its most vital point, but the possibility exists that some bolts are liable to be cut deeper than necessary by careless workmen. Moreover, it is unnecessary, as

tighter work can be done by slightly countersinking the sheet.

(c) It is good practice to enlarge the end screwed in the crown sheet for 1 in. or  $1\frac{1}{2}$  in. directly under the button head, making it slightly taper. For 1-in. round crown stays a good proportion is to upset the lower end for  $1\frac{1}{2}$  in. or 1 in. thread, leaving the upper end for 1-in. thread. For  $1\frac{1}{2}$ -in. round stays, lower end  $1\frac{1}{2}$  in., or 1 in. upper end, for  $1\frac{1}{2}$ -in. thread.

(d) The argument often advanced, that it is safer in radial stay boilers to omit all heads or nuts on firebox ends of crown stays, and allow a few to pull through easily in case of low water so as to put out the fire and relieve the pressure, does not seem to hold good in practice, as the sudden letting go of a few bolts throws such an additional load on the adjacent ones, that they are frequently unable to stand the strain and tear out row by row until the whole crown is blown down.

(e) As crown sheets are usually higher in front than behind and arched in the center in radial stay boilers, good practice indicates that a few crown stays (say 10 or 12) in the front and in the center—the highest point—should be left without heads or nuts, and simply riveted over. In case of low water these would pull out and relieve the pressure, before the rest gave way. A prominent railroad having this in view leaves every other crown stay riveted over without solid button head or nut.

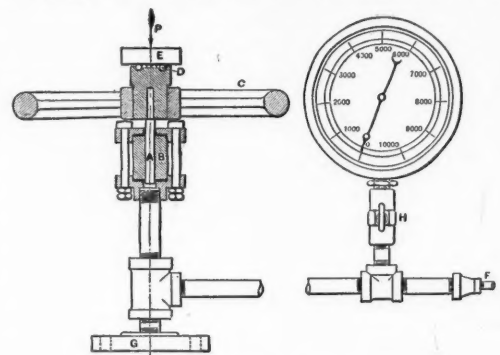
(f) It is better to face the sheet with a cutter, allowing the solid finished metal surfaces to come together without twisting or bending the crown stay, than to use a copper washer or to bend the bolt under the head in attempting to tighten it up against a rough uneven surface.

[The drawings show the conditions of the boiler pieces and of the bolts in some of the tests. The specimen number and the test number in each case corresponds to those given in the records printed above.]

#### Measuring Pressures of 10,000 Lbs. per Square Inch and Over.\*

BY D. S. JACOBUS.

The apparatus is shown in the accompanying figure. The pressure-measuring device consists of a steel plug, A, half an inch in diameter, fitted into a steel bushing, B, the hole in which is 0.5005 in. diameter. The top of the plug A is fastened to the center of the wheel C. E



Apparatus for Recording High Pressures.

is a steel plate which bears downward on the axis of the wheel C. There is a ball bearing, D, between the steel plate and the axis of the wheel. G is a circular base for supporting the apparatus.

A pressure is produced by means of a special device

\*Presented at the Hartford meeting of the American Society of Mechanical Engineers May, 1897.



not shown in the sketch. This pressure is transmitted to the measuring device by forcing oil through the  $\frac{1}{4}$ -in. pipe *F*. The oil pressure tends to raise the plug *A*.

The plug-and-wheel device is placed on a pair of platform scales, or in a testing machine arranged for tests of compressive strength, and the downward force *P* required to hold the block *E* in place is accurately measured. To this is added the weight of the wheel *C*, and

The money saving effected by the device may be figured as follows:

Number of engines turned per day (24 hours) .....	176
Men required .....	1
Average time required each man .....	5 min.
Total average time lost per engine .....	20 " "
Or, per day (24 hours) .....	59 hours
Present force, one man, day and night, or per day .....	24 " "
Total daily time saved .....	35 " "
At 12½ cents per hour .....	\$4.37

This is on the assumption that the men attend to wiping engines when they are not engaged at the table; otherwise, the saving would be much greater. The estimate of five minutes required for each man of the gang away from his work each time an engine is turned is a conservative one, for, as a matter of fact, during certain busy hours of the day, the men were at the table practically the entire time. It will be seen from this that it is possible to save, approximately, 35 hours of wipers every 24 hours, or say, two day and two night men working 8 hours each.

Under the conditions at West Milwaukee, it was not considered advisable to drop any of the wiping force, as the time saved could be used to good advantage in wiping, but an actual reduction in the pay-roll of \$3 a day was made in the following manner, without reducing the number of wipers. Working on an 8-hour basis, it was necessary morning and night to retain three men 4 hours, so as to be on hand

to turn the table between the times of changing gangs; this made a total of 24 hours' additional labor to be paid for every day, or, at the rate of 12½ cents an hour, \$3, which is now saved.

The cost of electric power furnished for turning the table must be deducted from the saving above shown. This is with one locomotive, equivalent to one-half a horse-power per hour. Assuming 6 lbs. of coal per horse-power per hour, and coal at \$2 per ton, this would give a cost of  $\frac{1}{10}$  cent for fuel for turning one locomotive, or 53 cents a day for coal for the total number of engines turned.

#### A Railroad Strike in Switzerland.

There has been a genuine railroad strike in Switzerland, which was probably the most complete movement of the kind that ever occurred. There was last year a general movement of the employees of the five principal Swiss railroads for an increase of pay, which resulted in conferences which had apparently settled the questions at issue, but last winter the men of the Northeastern Railroad complained that the company was not keeping the promises made at these conferences. The managing officers took no effective steps to satisfy these complaints, and the Board of Directors paid no attention to them until it was too late. The men were so exasperated by the conduct of certain of the officers that they announced that if no answer should be made to their demands by March 10 they would strike. On the 11th they held a meeting in Zurich and set the time for the strike at the midnight following. When the next train was due to leave Zurich, the cars stood ready

of Justice, who took with them the Attorney-General, to Zurich by a special train. They conferred first with the government of the canton, then with the management of the Northeastern Railroad, and the next morning with the committee of the striking employees. The railroad managers asked the Chief of the Railroad Department to act as arbitrator, and agreed to abide by his decision. The strikers hesitated to accept this proposition, except as to their original demands as to pay, etc., hoping to secure the removal of certain of the railroad officers who had been particularly obnoxious. But as no one would attempt arbitration were such a condition required, they finally agreed to accept the judgment of the Chief of the Railroad Department. This was made known to the men at 3 p. m., and traffic was at once resumed, the first train leaving Zurich at 5:58 on the 13th after an interruption of 42 hours.

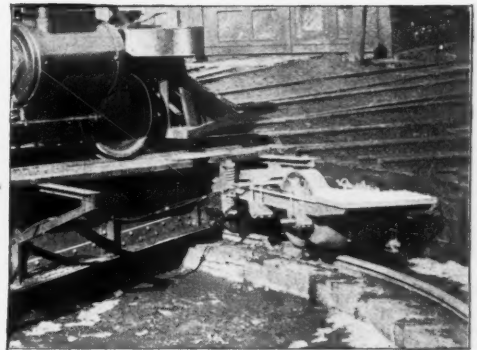


Fig. 3.—The Gibbs Electric Motor and Cart

The arbitrator decided later that the wages and contracts for employment should be established on the same basis as a connecting Swiss railroad, to date from Jan. 1, and required that some changes should be made in the regulations concerning furnishing security and the classification of stations. He also decided that the company should not dismiss or prosecute any one on account of the strike.

The strikers had been perfectly orderly; not the slightest injury had been done to persons or property; they simply refused to work. This refusal, doubtless, was a violation of their contracts, on the part of most of them, as they are employed on terms which protect them from arbitrary dismissal and prevent them from leaving at will. Their exasperation was due, apparently, to their belief that they had been cheated, in not receiving what had been promised at last year's conferences. The Chief of the Railroad Department protested against their striking, but he seems as arbitrator to have awarded them substantially what they claimed.

#### A New Form of Transmission Dynamometer.\*

BY FREDERICK BEDELL.

The apparatus which forms the subject of this paper has not been employed as a dynamometer, but has been used for some years in a different form in experiments upon synchronous motors. The instrument has given such satisfaction that it is with confidence that the application of the principle to the transmission dynamometer is advocated.

The dynamometer is shown in the accompanying figures, which have been drawn to show the relation of the parts rather than the actual construction of the instrument. The shafts *S* and *S'* are the two shafts between which the power is transmitted; these are arranged in line and with ends abutting. The shafts are connected by any convenient system of springs; this

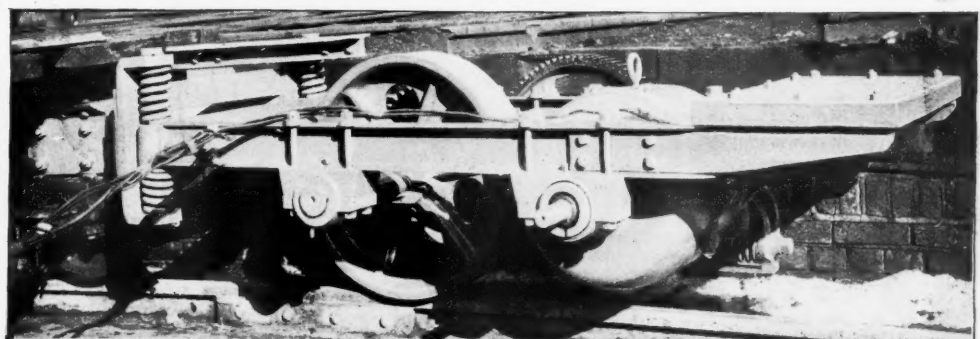


Fig. 2.—Motor and Cart Attached to Gibbs Electric Turntable.

The illustrations show an application of electricity for moving a locomotive turntable, which has been in operation for some months at the roundhouse of the Chicago, Milwaukee & St. Paul's West Milwaukee shops. The device consists of a one-wheel cart attached to one end of the table by a flexible spring connection, the cart running on the track in the pit. The necessary adhesion is obtained by the weight on the driving wheel of this cart, about 3,000 lbs. The application requires no changes in the construction of the table or pit. The table is operated by a resistance or starting box, which may be set either on the platform over the cart or at the middle of the table, as shown. The table can be run in either direction by movement of one handle either forward or backward. The electric connection with the dynamo is made by wires which are brought overhead to a light arch at the middle of the table, thence to the resistance box, and from the resistance box to the motor.

The motor is of a "series-reversible" type of 10-H. P. capacity. It is entirely enclosed and waterproof; in fact, the apparatus has been running exposed to the weather without the slightest injury. The motor is flexibly suspended on the cart, so that all shock in starting or reversing is removed. The motor and apparatus were made by the Gibbs Electric Co., of Milwaukee.

This roundhouse is at an important division point, where expedition in handling locomotives is desirable. On this table 176 engines are turned every 24 hours, or an average of over seven an hour. Before applying the motor attachment the table was turned by hand by push poles set at its ends; the number of men required was four, and the operation was very slow. By the power attachment one man does the work of four and in much less time. The table can be turned a complete revolution, including start, when light in 30 seconds; loaded with a 10-wheel engine, weighing with tender 100 tons, the table can be turned a complete revolution in 45 seconds.

In the station, the mail wagons drove up and the passengers came, but there was no locomotive, no conductor and no brakeman, and so at all the other Northeastern stations. No connections were made with other railroads; the through Paris-Vienna train could get no further than Basle; the mails were forwarded as far as possible by lake and railroads of other companies; the whole business of that part of the country was interrupted.

The next morning the Council of the Confederation, which may be called the Swiss government, held a meeting, and sent two of its members, the Chief of the Department of Railroads and the Chief of the Department

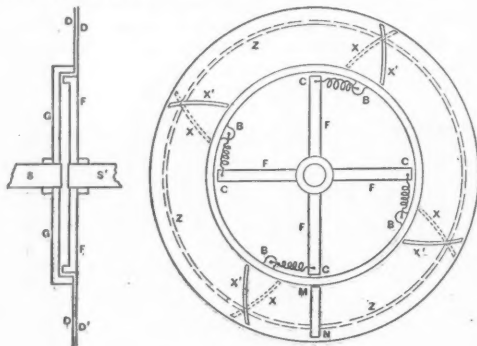
system may consist of a single spring or a number of springs, which may be either for tension, torsion or compression. The annular disc *D*, supported by the frame *G*, is carried by the shaft *S*. A similar disc *D'*, supported by the frame or spider *F*, is carried by the shaft *S'*. In the particular form shown, the frame *G* carries four lugs *B* which are connected to the spider *F* by the springs *BC*, which may be either springs for tension or compression. The exact arrangement of the spring connection between the shafts *S* and *S'* has no direct bearing

\*Presented at the Hartford meeting of the American Society of Mechanical Engineers, May 26, 1897.



ing upon the principle of the dynamometer, and any form of connection may be employed which is found most convenient.

Let us suppose that we have the shafts *S* and *S'* running, let us say, at a constant speed and with a variable load; that is, the shaft *S* is transmitting an unknown and varying amount of power to the shaft *S'*. When the shafts are idle they have a certain angular position with relation to each other. When they transmit power, however, the shafts depart from the zero position with reference to each other by an angle  $\theta$ , which depends upon the strength of the springs and the torque between the two shafts.



The Bedell Dynamometer.

To determine the amount of power transmitted from one shaft to the other, it remains to determine this angle  $\theta$  by which one shaft is displaced with reference to the other. This angle  $\theta$  may be determined by the following simple method, which constitutes the distinctive feature of this dynamometer:

In the disc *D* are slits, *X*, *X*, *X*, *X*; corresponding slits *X'*, *X'*, *X'*, *X'* are in the disc *D'*. These slits are slightly curved, the exact curvature necessary being explained later. The slits in one of the discs are the exact counterpart of the slits in the other disc, curving, however, in the opposite direction. The slits thus superposed give a single point of intersection. As the shaft *S'* is turned through an angle  $\theta$  with reference to the shaft *S*, the slits *X* shift with reference to the slits *X'*, and the point of intersection of the two slits is accordingly moved inward or outward from the center of the discs. The openings formed by the intersections of the slits will show a continuous ring of light, if the discs are illuminated from behind. For a constant torque the position of this ring of light will remain constant. The ring of light will, however, move inward or outward as the torque varies.

The slits are made of such a curvature that the change in the radius of the circle of light is directly proportional to the change in the angle  $\theta$ , that is, to the torque.

The instrument may be direct reading, and experience has shown the following form to be convenient. An incandescent lamp is placed behind the discs. This lamp is enclosed in a suitable opaque box so that it illuminates only the disc. In front of the discs is a stationary opaque screen covering entirely the whole apparatus. In this screen is a ground glass window. The incandescent lamp is behind the two discs and directly opposite this window. Instead of a complete circle of light we only see a line of light across this window. The scale at the side of this window shows the horse-power direct for a given speed. As explained above, the slits are made of such a curvature that the divisions of the scale are equal.

It is thought that such a dynamometer, being simple and direct reading, will prove convenient not only in testing dynamos, turbines, engines and revolving machinery of all sorts, but that it will find a useful place in power-houses and factories. Thus the engineer in charge of a station, cable-house or factory can at a glance see the exact amount of power which is being used, and he can regulate his turbines or the supply of steam to suit the demands.

#### Concerning Locomotive Performance.

Among the many letters drawn out by the *Engineer* (London) as a result of its recent criticisms of published statements of locomotive performance in the United States, the following appears in the issue of that journal of April 30. It is from Mr. C. E. Wolff, of 27 Melbourne street, Derby.

In your leader on this subject in your issue of the 16th inst., I think you rather underestimate the power of a modern locomotive, either English or American.

In the first place, with regard to adhesion, under ordinary average English conditions, a coefficient of 500 lbs. per ton or  $\frac{1}{4}$  can I think, be relied upon, and I have known many cases in which it must have been nearly one-third. My experience is that in good weather it is usually about a quarter. Hence, as the runs under consideration were probably made under favorable conditions, there does not appear to be any great obstacle on this score.

The second point I would like to call attention to is the probability that Mr. Barnes' low figure for train resistance is not far out for American practice. On English railways the resistance at 60 miles an hour is about 17 lbs. per ton, and at 20 miles an hour about 5 lbs. per ton. These figures, I may state, are the result of a very large number of experiments. Now, since the lubrications of the axles is practically perfect, we have no reason to suppose that the friction of a train increases much as the speed is increased, and therefore the greater part of the train resistance must be air resistance. This will, of course, vary with the surface area of the train, and, owing to the much heavier construction of American rolling stock than English, the surface exposed to the air per ton weight of the train will be much less. Hence it is only natural that the resistance per ton of an American train should be less than that of an English train.

With regard to your statement that "a train descending an incline of 1 in 100 will attain a speed of about 58 miles an hour and no more," I should like to point out that this method of estimating train resistance is very unsatisfactory, for two reasons. In the first place, there is a considerable resistance, due to pumping and cushioning of air in the cylinders, which it is impossible to

avoid when a train is running at a high speed without steam, and in the second place it is very difficult to say when the maximum speed has been attained. For instance, my experience would make the resistance of 22.4 lbs. per ton occur at 70 miles an hour, instead of 58. Supposing for the moment that 70 miles an hour is the correct figure, nevertheless two minutes would be required for a train to increase in speed from 58 to 59 miles an hour on an incline of 1 in 100, and anybody watching a speed gauge would hardly be likely to notice such a slow movement. Yet, notwithstanding this, the speed would ultimately rise to 70 miles an hour!

It also appears to me to be quite possible for an American locomotive boiler to supply steam fast enough to obtain an indicated horse-power for each 1.25 sq. ft. of heating surface. I know a case of an English locomotive giving an indicated horse-power for each 1.4 sq. ft. of heating surface continuously for an hour, and it must be remembered that, owing to the large diameters of American boiler barrels, it is possible to use larger tubes and to space them much farther apart than in an English boiler. This naturally permits of much more forcing than is possible in this country. You also appear to imply that a draft of six inches of water cannot easily be attained in a locomotive boiler, but as a matter of fact it is not uncommon for the difference of pressure between the ashp-an and smokebox to be as much as eight inches of water when running at a high speed. Nor does this require any noticeable back pressure on the diagrams, as it is very largely due to the pressure in the ashp-an when the front damper is kept open and the speed is high.

With regard to the water shown on the indicator cards, I have never known this to exceed 60 per cent. of the total water fed into the boiler, and it is rarely more than 50 per cent. The Vaulain engine was, therefore, probably using 26 lbs. to 30 lbs. of steam per indicated horse-power, instead of 16 lbs. Again, I should think it exceedingly probable that the evaporative efficiency of the coal is calculated from this erroneous estimate of the water used, and that the combustion per square foot of grate was, therefore, not as high as you calculate. This is, of course, mere hypothesis.

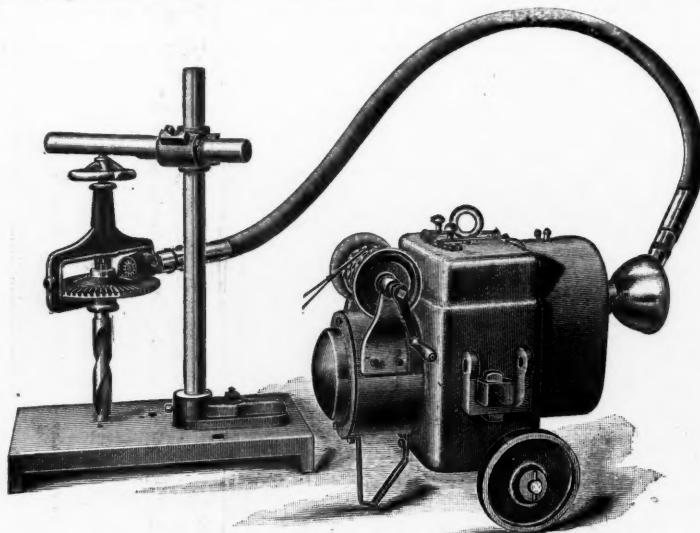
In conclusion, there is no doubt that the American locomotive is far more hard worked than the English. Its coal bill is fully twice as high for the same work, and its life, instead of being about 40 years, averages, I believe, about seven or eight. This great difference in practice is probably due to the great distances which American engines must often be from repairing shops, and also, in many places, to the rough roads over which they have to run. It cannot pay to pamper an American locomotive to the same extent as its English cousin, and it is therefore kept at work long after the English engine would be in the shops for repairs, or even rebuilding. American and English methods of working are both the results of practical experience, and I do not see any reason to believe that there is anything substantially wrong about either.

#### The Stow Flexible Shaft Electrically Driven.

In our issue of May 26, 1893, appeared an illustration and brief description of an arrangement for driving tools by a combination of the Stow flexible shaft and an electric motor. At that time the company had just got ready to offer this combination to users of light machinery. We show now the same arrangement in its present condition, somewhat improved after the experience of nearly four years of service. This combination has been giving satisfaction where there has been a demand for power to operate breast drills and

end plates to bring the oil chambers below the bearings, the motor can be run in almost any position. This type of motor can be furnished for direct connection if desired and also for track drilling on street railroads.

The accompanying illustration shows one of the iron-clad portable motors, connected by the flexible shaft



The Stow Flexible Shaft and Portable Electric Motor Running a Drill.

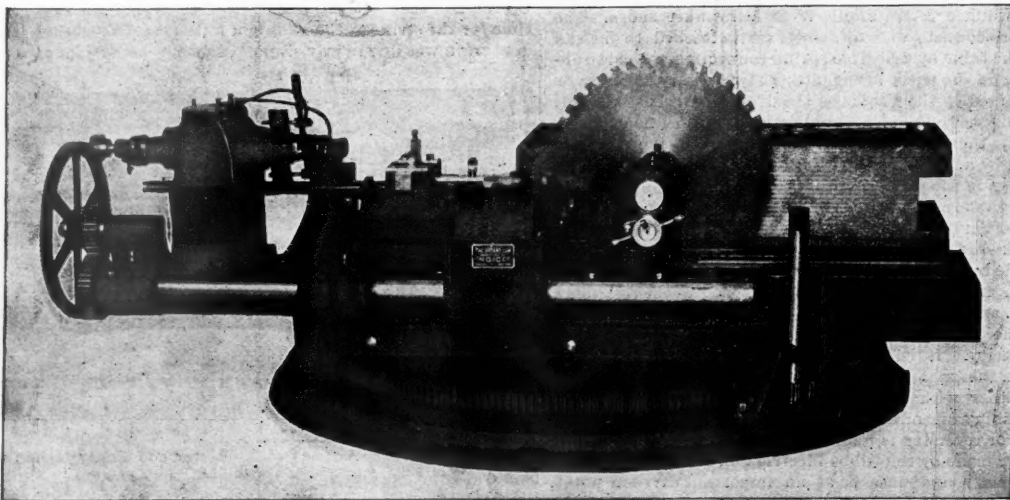
with a drilling machine. The frame of the motor is in the form of a hollow cube with the poles projecting inwardly. In the end of the frame is a circular aperture, over which is bolted the end plates supporting the bearings. One of these is extended into a short cylinder, forming a case for the commutator and brush holder. Messrs. Selig, Sonenthal & Co., 95 Queen Victoria street, London, E. C., England, are the European agents for this plant.

#### The Bryant Metal Saw.

The accompanying illustration shows the new Bryant Metal Saw now being put on the market by the Q & C Company, of Chicago, which is especially adapted for use in railroad shops and structural iron works. The machine is mounted on a circular base about 3 ft. in diameter and by means of a pinion working in a circular rack it can be swiveled through 90 degrees. The saw blade is 25 in. in diameter,  $\frac{1}{4}$  in. thick, and can be adjusted laterally  $1\frac{3}{4}$  in., while the feed of the machine can be changed from  $\frac{1}{4}$  to 1 in. per minute without stopping or checking the saw; in case of emergency a stop is provided so that the operator can throw the machine out of gear. The available surface of the saw blade above the arbor is 10 in. and to the right of the arbor, horizontal with the lower table, 10 in. The height of the extra table is 12 in., and the blade extends down 4 in. below the surface of the lower table. The weight of the tool is 7,000 lbs., and it is driven by a 3 horse-power electric motor. A similar machine is built by the Q & C Company mounted on a stationary base; this is provided with tight and loose pulleys for driving by belts.

#### The Creeping of Rails.

[The following is from an article by Mr. Couard, of the Paris, Lyons & Mediterranean Railroad, published in the



The New Bryant Metal Saw.

other light machinery at a reasonable distance from the source of power.

The motors have a normal speed without load of about 1,200 revolutions per minute, but they can be wound for as slow a speed as 800. The motors are made to be used on a 110 or 230 volt circuit; those below 2 H. P. are bi-polar, while those of 2 H. P. and over have four poles. The rheostats are protected by an iron case and the gears are also covered. By simply changing the

*Revue Générale* last August and now published by abstract by the Institution of Civil Engineers.]

In 1884 and 1893 investigations were made by the Paris, Lyons & Mediterranean to discover the influence at work tending to produce creeping of the rails, and the means of preventing it.

With regard to the influence of speed and brakes, the creeping was found to be above all produced by the shocks of the wheels on passing over the joints, the action of which is more noticeable as the speed increases, and, in consequence, the creeping is greater on



down gradients than on up gradients. When the brakes are applied the tendency to movement is accentuated, and this was particularly noticed on the approaches to stations, but the effect was diminished in cases where vacuum brakes were generally employed.

With regard to the influence of tunnels, it was found that apparently the rust prevented displacement of the rail and its attachments. No creeping whatever was discovered in the Crêdo tunnel between Lyons and Geneva; and on a gradient of 1 in 39 in the Sauvages tunnel, the maximum amount of creeping found was 4 in. at the end of nine years of service, equivalent to the annual amount on another line in the open on a gradient of 1 in 66. The author is of opinion that probably the nearly constant temperature in tunnels will explain the small amount of displacement.

In the case of curves, the inside rail, receiving the heaviest loads on account of the super-elevation of the outer rail, showed a larger amount of creeping than the outside rail. It was also found that in straight portions of double lines of way, owing to the inside rail being generally at a lower level than the outside rail, on account of unequal packing of the sleeper, the amount of creeping is more marked on the outside rail. A table is given, showing the results of some observations taken on curves on the single line between St. Germain-des-Fossés and Nîmes. The gradient on this line is 1 in 83 and the radii of the curves vary between 20 and 30 chains. The maximum amount of creeping was 6.07 ft. per mile in the case where the stop fish-plates were used at all the joints, 0.95 ft. per mile in the case where angle fish-plates, bolted to the sole-plates, were used at all the joints, and 8.45 ft. per mile where stop fish-plates were used at every other joint. The stop fish-plate joint consists of one flat plate and one angle-plate; the angle-plate, fixed on the inside of the rail, butts against the sole-plate on the joint sleepers. The rail in this case is retarded by only one sleeper, while in the case where angle fish-plates bolted to the sole-plates are used the two joint sleepers resist the movement of the rail. The latest dimensions of the latter type of joint fish plates are as follows:

Length of fish-plates.....	2.62 ft.
Thickness of vertical web.....	$\frac{3}{4}$ in.
Thickness of horizontal web.....	$\frac{1}{2}$ in.
Diameter of fish-plate bolts.....	1 in.
Diameter of sole-plate screw-bolts.....	$\frac{1}{2}$ in.
Number of fish-plate bolts.....	8
Number of sole-plate bolts.....	4 on each sleeper
Thickness of sole-plate (minimum).....	$\frac{1}{4}$ in.
Length of sole-plate.....	$4\frac{1}{2}$ in.
Width of sole-plate.....	$8\frac{1}{2}$ in.

The author points out the necessity of having a good ballast, preferably of broken stones. The rails in the line above referred to were Vignoles rails, but other tests made on bull-headed rails gave practically the same results. The author gives an account of the various means taken to prevent creeping since 1871, and concludes by recommending the following methods for rails of different lengths on lines with a large amount of traffic, and on branch lines with steep gradients:

Rail 19.63 ft. long	Angular fish-plates without stop-sole-plates or intermediate brackets.
" 26.24 "	Angular fish-plates with one stop-sole-plate or one pair of brackets.
" 32.81 "	Angular fish-plates with two stop-sole-plates or two pairs of brackets.
" 39.37 "	Angular fish-plates with three stop-sole-plates or three pairs of brackets.

The stop-sole-plate consists of a fish and sole plate combined in one plate, being fixed to the sleeper by three screw bolts and to the rail by one bolt. The intermediate bracket consists of two angle-plates  $5\frac{1}{2}$  in. long, bolted with one bolt through the rail, and with four screw bolts through the sole-plate.

For bull-headed rails the angle fish-plates appeared to be equally efficient, the sliding in the chair being found to be reduced by a half by this means.

#### Hydraulic Flanging at the Schenectady Locomotive Works.

About two years ago the Schenectady Locomotive Works contracted with the Morgan Engineering Co., of Alliance, O., for an hydraulic flanging plant. The design of the apparatus was carefully worked up with a view to adapting it to all classes of locomotive boilers in use in the United States. Fig. 1 shows the press, the principal dimensions of which are as follows:

Main table, 10 ft. 3 in. wide  $\times$  14 ft. long.  
Maximum width between upper and lower tables, 11 ft.  
Minimum height between upper and lower tables, 4 ft.

Size of rams:

- 1 main ram, 28 in. in diameter.
- 1 internal clamping ram, 14 in. in diameter.
- 4 radial clamping rams, 6 in. in diameter.
- 1 inverted top ram, 10 in. in diameter.

The main columns are of steel,  $7\frac{1}{2}$  in. in diameter and 27 ft. long. The total pressure exerted by main and radial rams only, with a regular working pressure of 1,500 lbs per square inch, is 550 tons.

This press has now been in use by the Schenectady Locomotive Works for the past year and a half, and Fig. 2, giving shapes produced, shows the wide variation of work to which it is adapted. The press produces work of exact uniformity, similar parts made from dies being exact duplicates in size and form, while the effect upon the steel in flanging is much less severe than produced by hand work with alternate heating and flanging. It is also found that the flanges turned by the press are softer than those turned by the ordinary method of heating and flanging by hand.

The plates to be flanged are heated in a large furnace with oil fuel, and after the flanging is performed the plates are still at a red heat, so that the work is practically free from strains when completed.

Flanging dies have been made by the Schenectady Works for their standard designs of locomotives, and it is found that quite a number of railroads are calling for hydraulic flanged boiler plates in their specifications—a practice which cannot be too highly recommended.

The Schenectady Works are also using, as a standard practice, the pressed steel boiler front and door, pressed steel cylinder-head covers, and steam chest casing covers, as are shown by Fig. 2, and have been often seen in the various illustrations which we have given of Schenectady locomotives in recent months.

#### Pay on the Railroads of Alsace-Lorraine.

The German Empire owns and works the railroads in the provinces of Alsace and Lorraine, which is the only part of the empire which is administered by the imperial authorities—something like a territory in this country. The imperial railroads, as they are called, are

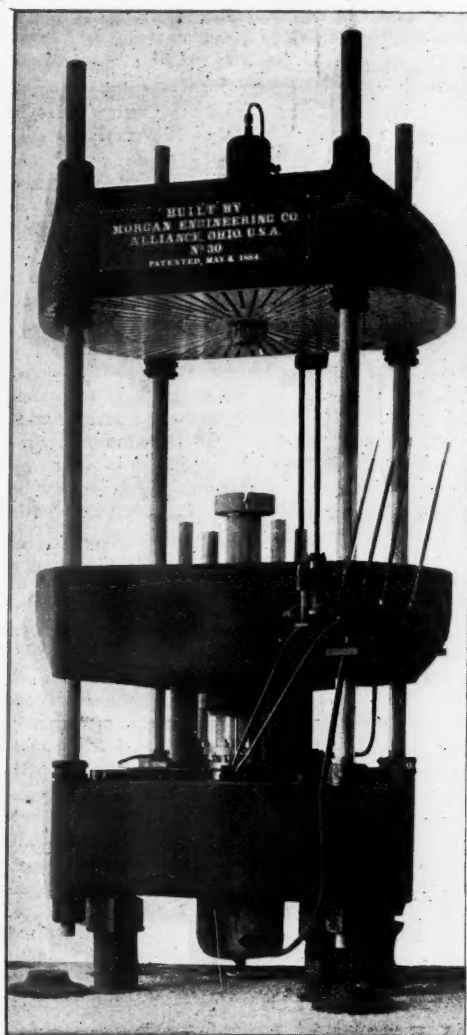


Fig. 1—Hydraulic Flanging Press at the Schenectady Locomotive Works.

under the general direction of an "Imperial Railroad Bureau," which has, however, some other duties, chiefly relating to maintaining uniformity in the railroads of the different countries in the empire, which, in case of war, would all be subject to a single imperial management.

In submitting estimates for the expenditures on the imperial railroads for the coming year, authority is asked for a considerable advance in the pay of officers and employees, which gives opportunity to see what the advances are. In most countries where there are state

The advances begin at the top, with the officers of the Imperial Railroad Bureau. Its President has been getting \$3,600 a year and is to have \$4,800. The seven officers associated with the President were paid \$1,800 to \$2,376; their pay is advanced to \$1,800 to \$2,640. The chief clerk of their office has an advance from \$1,306 to \$1,440; 21 other office assistants who had \$720 to \$1,306 are to have \$720 to \$1,440, their average pay being advanced from \$1,008 to \$1,080 per year. Three clerks of lower grade have an advance from an average of \$576 to an average of \$612.

In the administrative office of the imperial railroads, the three "councillors" have the same pay as the assistants of the President—\$1,800 to \$2,640, formerly \$1,800 to \$2,376.

For the direct operation of these railroads there is a "general direction" of 14 members, which is something like the staff of officers in the general offices of our railroads. They have been paid salaries of \$1,128 to \$1,560 each, with a bonus of \$192; they are to have \$1,128 to \$1,848, with the old bonus. The 11 "directors of railroad operation," whom we may liken to division superintendents, are to have \$1,104 to \$1,680 with a bonus of \$144, a reduction of \$48 in the bonus, an advance of \$288 in the highest salary, the average advancing from \$1,248 to \$1,392. The chief cashier gets an advance of \$144 to \$1,344, with \$96 bonus. Thirty-five subordinate officials in the operating, construction and machinery departments are to have from \$984 to \$1,632, with \$96 bonus. The chief telegraph officer begins at \$984 a year and rises to \$1,632 with \$96 bonus. The station-masters at Strassburg and Metz, the most important stations, get an average of \$864, beginning at \$648 and rising to \$1,080, with a bonus of \$57; 19 "first-class" stationmasters begin at \$648 and rise to \$1,080, with \$57 bonus; 22 other station officers, in charge of the cash and the shipping of freight, have the same salaries; 20 "technical railroad clerks," from \$576 to \$1,080, with \$57 bonus; 5 shop foremen, the same, averaging \$756; 228 "non-technical railroad clerks," \$504 to \$1,080, averaging \$792, with \$57 bonus; 5 storekeepers, the same; 92 "second class" stationmasters, \$504 to \$792, with \$57 bonus; 32 "first-class" roadmasters, \$504 to \$792, averaging \$600, with \$57 bonus; 168 "operating clerks," \$432 to \$792, averaging \$612, with \$57 bonus; 596 station foremen and station assistants, \$432 to \$720, averaging \$556, with \$57 bonus; 113 roadmasters, the same; 441 locomotive runners, \$360 to \$600, averaging \$480, with \$75 bonus.

#### Foreign Railroad Notes.

In Austria-Hungary, in 1896, 812 miles of new railroad were opened, against 608 miles in 1895. More than three-fourths of the new road is in Hungary.

Not content with his little underground railroad, the Manager of the Budapest street railroads has submitted to the authorities a plan for an elevated railroad to connect the different stations in the city, and serve for through traffic and other purposes.

On the Prussian State Railroads in their last fiscal year there were 71 workshops where 2,313 apprentices were trained systematically. Of these 600 were in the first year of their apprenticeship, 557 in their second, 578 in their third, and 578 in their fourth and last year. School as well as shop instruction is given to these apprentices.

The "limited train," called there a "luxury" train makes progress in Europe. It is proposed in the next winter season to run one all the way from the German

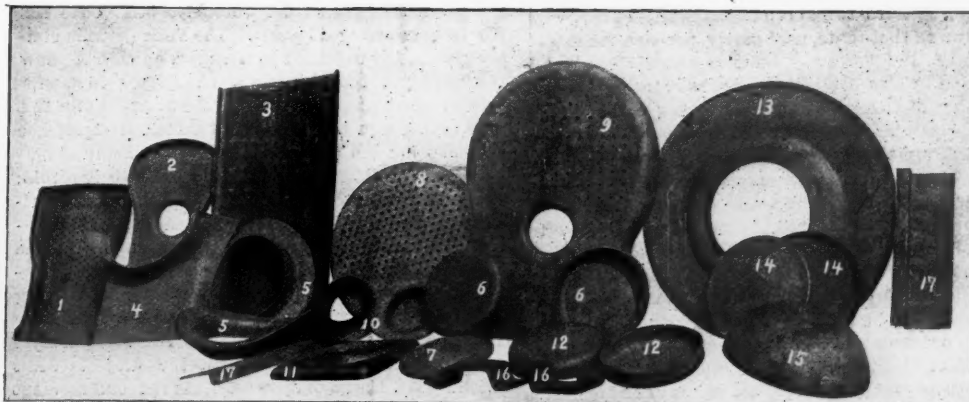


Fig. 2—Shapes Made by Flanging Press at the Schenectady Works.

Descriptive Data.—1, Firebox tube sheet (crownbar boiler), tube holes not drilled out; 2, firebox back sheet (radial stayed boiler); 3, firebox crown sheet (crownbar boiler); 4, throat sheet; 5, dome connection; 6, dome ring (opening in top not cut out); 7, dome cap; 8, boiler front tube sheet, tube holes not drilled out; 9, boiler back head; 10, smokestack base; 11, steam chest casing top; 12, cylinder head casing; 13, boiler front; 14, boiler front door; 15, dome casing top; 16, brake cylinder support; 17, deck piece in cab.

railroads, there is a constant pressure from the employees for an advance in pay, and where all the railroads are state railroads, the employees, united as they are, make themselves felt more than most bodies of organized workmen are able to do. However low the pay may be, there is great competition to get the places. It must be borne in mind that they are really more desirable than would appear from the amount of salary; for the appointments are permanent, and carry with them certain privileges, assistance in sickness and pensions in old age.

Ocean to the Gulf of Naples, starting from Hamburg and passing through Berlin, Munich, Verona, Florence and Rome, a distance of 1,386 miles, which it is purposed to make in  $39\frac{1}{2}$  hours, or at an average speed of 35.4 miles an hour, the time required now being 49 $\frac{1}{4}$  hours. The expectation is that the train will run daily north of Verona, and twice a week between Verona and Naples. The lines extend through three countries, but for only a comparatively short distance in Austria, and are under six different managements.





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## EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

An interesting legal question seems likely to arise in Connecticut over the matter of the operation on Sundays of the third-rail line between Hartford and New Britain. The Sunday laws of the state in reference to the operation of steam roads are not only in form pretty stringent, but in reference particularly to passenger trains between 10:30 a. m. and 3 p. m. have been very rigidly enforced. They provide that no Sunday train shall be run between sunrise and sunset, except from necessity or mercy, and that the same rule shall apply to the handling of freight on the roads and at stations. But the old and elastic "necessity or mercy" proviso has been stretched so as to nullify the rigid law in part. Thus between 10:30 a. m. and 3 p. m. trains carrying the mails and other trains or classes of trains may be authorized by the Railroad Commissioners on application made to them on the ground that the trains are required by public necessity or for the preservation of freight. Up to 8 a. m. the same authority is given to the Commissioners in reference to the handling of freight. Violation of the foregoing prohibitions is punished by a fine of \$250 in each case of such violation, and any company which charges less than the regular week-day fare on Sundays is fined \$50 for each offense. The law relating to the operation of passenger trains between 10:30 a. m. and 3 p. m. was passed 10 years ago, has been strictly enforced, and it is that statute which now bears most directly on the coming third-rail service. Are the electric cars to be run on that route, used partly, perhaps, for steam cars also, and certainly built as a steam road and operated by steam on other tracks, "trains" in the meaning of the law? If those cars are not trains when operated separately are they trains when coupled together or operated with trailers? And, finally, is a legal distinction to be made between such a line operated between a few stations, and chiefly for through business, and the ordinary trolleys with their frequent and often irregular stops, and which are now run regularly in Connecticut on Sundays and the Sunday service of which is not infrequently "doubled up" under the stress of excursion traffic? These are questions which some of the strict Sabbatarians of Connecticut may compel the courts of the state to answer, and a localized phase of the matter is that some years ago when the Railroad Commission proposed to authorize Sunday trains between New Britain and Hartford "for the benefit of church goers" such a hue and cry was raised that the plan was dropped. Evidently the application of electricity to steam roads is to have its Sunday problems, as well as secular ones, though its ultimate assimilation in the matter to the trolley on highways can be foreseen.

Receiver Felton, of the Cincinnati, New Orleans & Texas Pacific, has, in a new code of train rules which he has lately issued, one of the most thorough, systematic and comprehensive manuals of the kind that

was ever made.\* He has made use of the original main body of the Standard Code, using the original numbers (1 to 121); the rules for telegraphic train orders, using the original numbers; and, in addition, has adopted the voluminous rules for engineers, firemen, conductors, brakemen, telegraph operators and others, that were reported by the Committee of the American Railway Association, in October, 1894, but which were never adopted by the Association. These last, which, except those for telegraph operators, were drafted by Mr. C. A. Hammond, are characterized by a fullness in the subject matter and a clearness and unity of style (accompanied by all reasonable brevity), that we have never seen in any other code. If these rules are faulty, it is in covering too much ground, trying to tell the employee too many things; and the first impression on reading Mr. Felton's code is one of surprise that so few of the rules are omitted or materially modified; but a careful examination shows that the compiler, while, no doubt, using material from individual codes gathered in all parts of the country, has included very little that is not applicable on the great majority of roads. We suspect that the "Queen & Crescent" trainmen are picking flaws in these rules by the dozen, and it seems to us that some kind of introductory paragraph ought to be supplied to explain the proper way of interpreting rules on subjects which cannot be satisfactorily treated in a book of rules without going into detail far beyond the limits of a handbook; this is necessary for employees who take everything literally (or not at all), and also for those of the opposite disposition, who, on finding rules hard to comply with, lose all respect for the code; but these rules constitute a very valuable manual and, whether their adaptation to the men (or the training of the men up to an appreciation of the rules) requires little or much labor, they should be persistently maintained. There was, it seems to us, a decided advantage in having these rules drafted by an experienced superintendent who was not at the time connected with any particular road, and who was, therefore, free from the hampering conditions which are pretty sure to affect the ordinary committee man's work, however hard he may try to get outside of himself. A perusal of these rules reveals this advantage, and, whatever the need of modifying individual rules, it marks this code, in our opinion, as the best ground work now in existence for a code of "general regulations."

The two most prominent codes that one would naturally compare with that of the "Queen & Crescent" are those of the Pennsylvania Railroad and of the English Clearing House Association. Numerous American codes give far more detail than the Pennsylvania's, but yet lack evidence of the thorough study of the whole field which appears in the code we are now considering. Bearing in mind that a comparison of codes has to do mainly with style, arrangement and clearness of language, the two named will be found to best represent the two other types. The Pennsylvania's "general regulations" (numbered 217 to 242) are similar in spirit to Mr. Hammond's, but are so much more condensed that no comparison is possible. Where the Pennsylvania has a single rule of about 500 words the other code has 100 rules covering 20 pages. The Pennsylvania simply gives a few dignified paragraphs, enough to show the employee that he is not wholly free to use his own judgment, and there stops. The argument for this plan is that a man who has had sufficient experience to be fit for his job ought to know the numerous things set out in the fuller code, without being told; that telling him too much produces unnecessary irritation. The English codes are valuable for comparison with those on this side the water chiefly in the matter of precision of language. We have heretofore given samples of their style. While not holding them up as patterns, we think they afford valuable hints on a great variety of points. The English style would, however, if applied to all the subjects dealt with by Mr. Hammond, necessitate the enlargement of his book to a size beyond the capacity of the freight brakeman's pocket. But this does not condemn it as impracticable, for, it must be remembered, even so full a treatment as Mr. Felton's is still incomplete. Many roads (including, very likely, his) have separate manuals for conductors, on ticket collecting, for station baggagemen, for local freight agents, for men who have to do with air-brakes and for other classes, which, if added to the rule-book, would double it in size. With all the progress of the last 10 years, the evolution of the employees' manual is still incomplete, and it may be a good while before there will be any general agreement as to whether there

\* See notice and extracts on a preceding page.

should be one, two or a dozen manuals for the multifarious matters that the railroad manager has to put into print for his employees; but we think Mr. Felton has adopted what must prove to be very nearly the true normal method. Any additions which he may need to make in the future can be incorporated with the present code without unduly disturbing it.

## Another Supreme Court Decision.

The Supreme Court of the United States has decided that the Interstate Commerce Commission has no power to prescribe rates. We have not the full decision (the press despatches are summarized in another column), but the result of the deliverance, according to the Washington correspondent of the *Journal of Commerce*, will be "to compel the Commissioners to declare successive rates unreasonable until carriers get down to what they consider reasonable rates." The pith of Justice Brewer's argument appears to be that the Commission, in dealing with a complaint, whether the same be from an aggrieved shipper or be made by the Commission itself, can only correct the wrongs of the past; it cannot touch the business of the future, because at any moment conditions may arise which will make it necessary to change the rates.

This decision is in the direction of the most enlightened public policy, for it tends to keep the primary rate-making power where it belongs, in the hands of the railroads; but we suspect that the full opinion, when published, will prove to contain fine-spun arguments of which the chief results will be additional legislation by Congress; and such legislation is not likely to mark any real progress. It may be that the Washington correspondents have missed essential points of the decision, but as far as can be gathered from what they give us, Justice Brewer has simply put the matter of rate regulating where it can be more easily dealt with by the courts. He seems to have said that the Commission can correct an unjust rate in the past, but cannot even consider the question of injustice as regards the future. With the powers of the Commission in their present status—where every decision of importance must be approved by a court before it can be enforced—this and some other recent decisions of the courts cannot be looked upon as anything more than discussions about words. If the Commission cannot, without the aid of the courts, enforce an order to refund overcharges on past business, what difference would it make to let it issue orders touching future transactions? A court—Judge Brewer himself, for instance—will proceed with confidence in deciding that a certain rate heretofore in effect was or was not unjustly high; but when asked to prescribe rates for the future, will hesitate, or decline to act, recognizing the difficulties in the way of doing justice. The attempt here seems to be to lift the Commission up to a level where it can take a similar attitude; but as long as the Commission has no power to enforce its orders, either past or future, what will the effort amount to? It may be looked upon merely as a warning to the Commission not to bring before the courts questions which the judges are sure to decline to consider.

Whatever the details of Judge Brewer's argument, the result of the decision will be to intensify the demand for additional legislation by Congress. The wishes of the Interstate Commerce Commissioners in this direction, as given out several days before the publication of the present decision, are outlined in another column of this paper. Certain railroad officers, interviewed by New York daily papers, seem to believe that the Commissioners will now modify their views and will be more favorably disposed toward the legalization of pooling; but we doubt the accuracy of this view. Chairman Morrison is decidedly opposed to pooling, and there seems to be among the other Commissioners enough sympathy with his view to prevent any decisive utterance in the opposite direction. This being so, and the sentiment of a majority of Congress being evidently either populist or in the deplorable condition of carelessness due to the doubt and ignorance inseparable from such an abstruse subject, it would seem more likely that the Commission, and the Congressmen and others who get their ideas from the Commission, would seek legislation conferring more explicit rate-making powers. The Supreme Court has not said that Congress cannot empower the Commission to make rates; but merely that it has not yet done so. There are intelligent men in Congress who have already proposed pooling laws and who probably will now make renewed efforts; the Senate Committee is trying to improve the Foraker bill and Senator Cullom has this week introduced ("by request") a new bill; but the question is,



Where does the majority stand? This is as much belclouded with doubt as ever.

The main feature of interest in the latest propositions concerning legalization of pooling is the requirement that railroads applying for leave to pool earnings shall agree, for the term during which the pool is to run, not to raise the rates on the freight which is pooled. All four of the Commissioners who have spoken seem to advocate this clause, and it sounds so very reasonable that every Congressman will undoubtedly favor it. Moreover, many railroad officers, in their public answers to the critics who claim that pooling is a device to facilitate advances in rates, have repeatedly asserted that the railroads do not wish to raise rates, but only to put a stop to the downward tendency; to secret and illegal reductions. Congressmen will say, of course, that it is only fair to take the railroads at their word, and to make the agreement binding. How generally the railroads will accept this view remains to be seen. It is quite possible, no doubt, to make pools in limited territory, for a limited time on a limited number of commodities (perhaps a very few), which would materially aid in keeping rates stable and with which an agreement not to change would not be detrimental. On grain to the seaboard, for instance, the competition is so severe and the ruling conditions are now so well understood that a reasonable maximum rate ought to be ascertainable for a year ahead. The highest rate that the railroads could hope to get would be lower than any government could fairly ask them to accept as a maximum.

But in acting under a law of this kind the railroads would be accepting a principle which contains the paternalistic evil of governmental regulation in its worst form; the principle that five men can, and rightfully should, prescribe the rates to be charged on 85 billions of ton-miles of freight annually. The revenue on this freight, 700 millions of dollars, is ten per cent. on a capital of seven billions; that is to say, roughly speaking, we have here a proposition to let a small government board manage a business requiring a capital of seven billions of dollars. The magnitude of the question must be appalling to every reasonable man, even if the details were far simpler than they are. Indeed, the problem of railroad regulation is appalling as it is. Congress and the state legislatures act, and the courts check their action: the courts in turn are subject to the balance-wheel of the Supreme Court at Washington. This machinery, it would seem, ought sufficiently to enforce deliberation and caution, and yet we are constantly running against obstacles which it takes the combined available wisdom of all these instrumentalities a long time to overcome. Even our balance-wheel, with its nine spokes, often tries to revolve in both directions at the same time, five going one way and four the other.

Justice Brewer (as reported) has not fully described the powers of the Interstate Commerce Commissioners, for they are directed to "enforce the provisions of the Act," one of which is that all rates shall be reasonable and just; and we are curious to see how he defines the line by which he limits their powers to the field which he seems to have marked out; but the only safe and logical limitation is that of the Massachusetts law; to let the Commission devote its powers to giving railroad problems their due measure of publicity, and compel them to make every recommendation so logical, reasonable and clear that it will compel the support of the courts and of public opinion. But this theory requires five very wise Commissioners.

#### The New York Anti-Scalper Law.

The much discussed anti-scalper law of New York state is now an established fact, the Governor having approved the bill on May 18. It goes into effect on Sept. 1, 1897. The bill contains nine sections, and appears to have been very carefully drawn. In substance it prohibits selling or attempting to sell any ticket or evidence of transportation or of the right to a steamboat berth or stateroom, except by authorized agents, in their offices, who must have a certificate from the company, naming the town, street and street number. No person shall ask, take or receive any consideration for a ticket or for procuring one unless he is an authorized agent, nor shall any person, as such agent, sell or offer to sell except at his office, nor for a sum exceeding the regular rate; but an agent may buy from another agent a ticket to carry a passenger to the point where the first named agent's road begins. The purchaser of a ticket may have it redeemed within 30 days, at the ticket office where sold if wholly unused, or at the general office if partly used. The agent at the beginning or the end of the journey must take partly used tickets, giving a receipt, and send them promptly to the general office, and such tickets must be redeemed within 30 days. The act contains the usual regulation about the value of partly used tickets.

Wrongful refusal to redeem is punished by a fine of \$50 and costs. There is a stringent prohibition of dealing in orders for tickets, except by authorized agents, and agents selling orders must direct them to the company at an office.

Violation of the act is punishable by imprisonment not exceeding two years. Conspiracy to sell or attempt to sell tickets in violation of this act is punishable by five years' imprisonment. All offices kept for the purpose of selling tickets in violation of this law are deemed disorderly houses, and all persons keeping any such office are liable to six months' imprisonment. The act shall not prevent the sale of the tickets of a vessel by the purser in his office on board the vessel, nor the sale by a railroad ticket agent at his office, of any tickets of the company; nor the sale by a conductor of any tickets of the company upon a train.

This is a matter in which the proof of the pudding is entirely in the eating, and we shall see what we shall see. It is said that ticket brokerage flourishes in some cities in Pennsylvania in spite of a prohibitory law; and the New York brokers will, of course, try to show that this law does not apply to interstate tickets. Whether they will get encouragement enough from good lawyers to carry this point to a court of last resort remains to be seen. As the law seems to come within the definition of a reasonable police regulation and as Congress has taken no action conflicting with it (always excepting the anti-trust law, which conflicts with everything) we should say that the scalpers would have an uphill job.

The enforcement of a law prohibiting outside ticket selling will probably depend on the vigilance and energy of the railroads which desire to see the demoralizing business stopped. As the officers of the New York Central (and of other roads) have worked very persistently for the passage of this law, we may expect that they will be on the watch for violators of it.

#### April Accidents.

Our record of train accidents in April, given in this number, includes 36 collisions, 63 derailments and 6 other accidents, a total of 105 accidents, in which 21 persons were killed and 90 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident, as reported, make it of special interest.

These accidents are classified as follows:

COLLISIONS.	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two.....	11	0	0	11
Misplaced switch.....	0	1	1	2
Failure to give or observe signal.....	1	0	1	2
Mistake in giving or understanding orders.....	0	1	0	1
Miscellaneous.....	1	0	3	4
Unexplained.....	6	2	8	16
Total.....	19	4	13	36

#### DERAILMENTS.

Broken rail.....	3	Broken car.....	2
Loose or spread rail.....	1	Misplaced switch.....	1
Defective bridge.....	1	Careless running.....	1
Defective switch.....	2	Runaway.....	1
Defective frog.....	1	Bad loading.....	1
Defective track.....	1	Landslide.....	1
Broken wheel.....	3	Malicious obstruction.....	2
Broken axle.....	6	Accidental obstruction.....	1
Broken truck.....	4	Unexplained.....	26
Fallen brakebeam.....	1		
Failure of drawbar.....	4		
			63

#### OTHER ACCIDENTS.

Boiler explosion.....	2
Cars burned while running.....	2
Various breakages of rolling stock.....	1
Other causes.....	1
	6

Total number of accidents..... 105

A general classification shows:

Collisions.	Derailments.	Other accidents.	Total.	P. c.
Defects of road.....	9	0	9	9
Defects of equipment.....	20	3	23	32
Negligence in operating.....	4	3	7	15
Unforeseen obstructions.....	0	0	0	4
Unexplained.....	16	26	42	40
Total.....	36	63	105	100

The number of trains involved is as follows:

Collisions.	Derailments.	Other accidents.	Total.
Passenger.....	15	18	33
Freight and other.....	43	45	88
Total.....	58	63	121

The casualties may be divided as follows:

Collisions.	Derailments.	Other accidents.	Total.
Killed:			
Employees.....	6	9	15
Passengers.....	0	2	2
Others.....	1	2	3
Total.....	7	13	20
Injured:			
Employees.....	28	23	51
Passengers.....	2	26	28
Others.....	3	4	7
Total.....	33	53	86

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road.....	1	11	2
Defects of equipment.....	0	0	3
Negligence in operating.....	0	2	6
Unforeseen obstructions and maliciousness.....	1	11	2
Unexplained.....	0	4	3
Total.....	2	28	16

Fourteen accidents caused the death of one or more persons each, and 25 caused injury but not death

leaving 66 (63 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with April of the previous five years shows:

	1897.	1896.	18 5.	1894.	1893.	1892.
Collisions.....	36	21	33	37	72	47
Derailments.....	63	72	9	62	92	86
Other accidents.....	6	1	9	5	9	10
Total accidents.....	105	94	117	104	173	143
Employees killed.....	16	22	17	17	33	30
Others killed.....	5	6	10	11	2	9
Employees injured.....	51	49	50	59	93	107
Others injured.....	36	55	40	29	29	31
Passenger trains involved.....	34	22	37	30	58	45

Average per day:

	3.50	3.13	3.90	3.47	5.77	4.77
Accidents.....						
Killed.....	0.70	0.93	0.90	0.93	1.17	1.30
Injured.....	3.00	3.47	3.00	2.93	4.07	4.60

Average per accident:

	0.20	0.30	0.23	0.26	0.20	0.27
Killed.....						
Injured.....	0.86	1.10	0.76	0.84	0.70	0.97

Only two train accidents in April resulted in fatal injury to passengers. One of these accidents is said to have been due to deliberate loosening of rails. Another disaster due to the same cause was that on the 22d near Garland, Ala., where two trainmen were killed. This last occurred in a region where instances of malicious wrecking have been rather frequent of late (at Gurnee, Ala., Dec. 27, seventeen passengers were killed); and if the evidence of design in these track obstructions is as clear as it is reported to be, the police authorities have reason to call upon the citizens to help them enforce the vagrant laws. Malicious interference with tracks is a trouble that railroad officers can do little to cure unless they have the active co-operation of the state and municipal police authorities. Indeed, the latter should take the lead in protecting citizens (whether they be riding on cars or sitting in their homes) whenever vicious tramps are at large.

Another accident in the South, the butting collision at Harrisburg, N. C., on the 11th, where a mail clerk was burned to death, is to be classed with the worst of the month, but its causes cannot be considered because we have not succeeded in getting the essential facts. The North Carolina Railroad Commissioners do not issue blue-books.

April was marked by three wrecks of large bridges; at Allegheny City, Pa., on the 5th; at Fish's Eddy, N. Y., on the 28th, and at Carpenter, O., on the 29th. In the first case the evidence that a derailed car knocked down the bridge seems to be quite satisfactory; in the second the evidence is in the same direction, but by no means conclusive; in the third it is very unsatisfactory, if not entirely wanting.

We find only five street car accidents of any consequence in April, but they were more fatal than usual, 7 passengers being killed and 9 injured. At Allegheny City, Pa., on April 8, an electric street car broke through a gate at a crossing and ran into a passenger train of the Pittsburgh, Fort Wayne & Chicago, doing considerable damage and fatally injuring one passenger. It appears that the controller on the front end of the car was out of order and that the car was being managed at the rear end. It had been brought to a full stop about 20 ft. from the crossing, but a passenger in getting aboard accidentally moved the handle of the rear controller and turned on a powerful current.

At Tampa, Fla., on the 27th, a street car was run into by a locomotive, killing 3 passengers. The motorman, who also acted as conductor, was at the time inside the car collecting fares. It appears that in a slight controversy with some passengers he forgot his duty as motorman and allowed the car to run upon a crossing. At Portland, Or., on the 27th, a car which had got beyond the control of the motorman was derailed on or near a bridge and fell into the river, 3 passengers being killed and 9 injured.

#### Coal Production in 1896.

Statistics of the production of coal in the United States for the year 1896 have been recently published by Messrs. Adler & Ruley, of Philadelphia. The production of that year was 190,567,844 tons, being 3,423,089 less than in the preceding year. Coal is produced in commercial quantities in 28 states and a list of these states with their production for three years is given below. The quantities are given in thousands, that is, three ciphers are omitted.

	1896.	1895.	1894.
Alabama.....	5,744	5,706	4,381
Arkansas.....	905	911	786
California.....	64	75	71
Colorado.....	3,396	3,401	3,021
Georgia.....	290	261	355
Illinois.....	19,787	17,736	17,114
Indiana.....	4,068	4,312	3,454
Indian Territory.....	1,235	1,228	966
Iowa.....	3,855	3,196	3,777
Kansas.....	2,984	3,199	3,611
Kentucky.....	3,253	3,266	2,977
Maryland.....	4,177	3,897	3,474
Michigan.....	66	61	64
Missouri.....	2,420	2,283	2,383
Montana.....	1,172	1,050	927
New Mexico.....	667	673	615
North Carolina.....	25	20	13
North Dakota.....	43	40	44
Ohio.....	12,500	13,681	11,910
Oregon.....	96	66	48
Pennsylvania, hard.....	53,472	57,969	51,826
Pennsylvania, soft.....	50,925	52,402	49,500
Tennessee.....	2,664	2,320	2,479
Texas.....	500	459	421
Utah.....	503	450	452
Virginia.....	1,409	1,461	1,038
Washington.....	1,203	1,249	1,320
West Virginia.....	11,000	11,063	10,861
Wyoming.....	2,193	2,515	2,417
Total.....	190,568	193,991	171,317



It will be observed that about 80 per cent. of the total production in 1896 was in the five states of Alabama, Illinois, Ohio, Pennsylvania and West Virginia, which states produced 153,427,627 tons, or 5,162,735 tons less than the year before. The decline in the total production was 1.7 per cent., and the decline in the production of these five states was 3.3 per cent. Probably if the falling off in production had been as great as the general business depression called for, the trade, particularly in the sections having a heavy output, would have been in better shape than it is to-day.

The average prices received per ton at the mines for soft coal, in the five states of greatest production for the two years last past, follow:

	1896.	1895.
Alabama.....	\$ .90	\$ .95
Illinois.....	.80	.80
Ohio.....	.78	.82
Pennsylvania.....	.70	.71
West Virginia.....	.70	.76

The mine decreases when considered in connection with the heavy drop in prices at trade centers are small. This means that the carrying companies have been forced to make heavy sacrifices in freight rates in order to hold their business. That the causes back of these conditions were deep seated is evident from the fact that since Jan. 1 the trade of these various regions has steadily grown worse, and to day the three great markets, namely, tidewater, the great lakes and the Ohio and Mississippi River territory, are in worse condition from the standpoint of profits, than in the history of the business.

These prices also suggest another striking condition, namely, that coal is being sold at about as low a figure at the mines as is compatible with anything like a moderate rate of interest on the investment. It is perhaps not to the railroad companies that they cannot longer look to the coal producers for further sacrifices in order to hold their markets. The heavy competition between the Ohio and Pennsylvania fields, as set forth in these columns April 19, resulted in an average decrease of four cents per ton. The Illinois and Pennsylvania fields appear to have reached bed rock, the average changes being slight. The West Virginia territory shows a loss of six cents per ton, due largely to the aggressive attitude of the operators and railroads of that region at the beginning and the end of the year. A very noteworthy gain was recorded in the anthracite field of Pennsylvania, the price at the mine being \$1.65 in 1896 against \$1.54 in 1895. It is figured by various authorities, and was testified to before the Lexow investigation, that the increased revenue derived from anthracite in 1896 over 1895 was 30 cents per ton on the average. The difference between this figure and nine cents, or say 21 cents, is approximately the gain made by the transporting companies. The proportion of three to seven, just about represents the distribution of revenue. A table setting forth the cost at the mine in each state in the two years follows:

	1896.	1895.		1896.	1895.
Ala.....	\$ .90	\$ .92	N. C.....	\$1.66	\$1.50
Ark.....	1.33	1.25	N. Dak.....	1.10	1.10
Cal.....	2.30	2.30	Ohio.....	.78	.82
Colo.....	1.32	1.23	Ore.....	3.35	3.32
La.....	.85	.87	Penn.....	1.65	1.54
Ind.....	.80	.80	Anthracite.....	.70	.71
Ind. Ty.....	1.48	1.63	Tenn.....	.86	.....
Iowa.....	1.20	1.37	Texas.....	1.88	2.28
Kan.....	1.13	1.23	Utah.....	1.35	1.39
Ky.....	.84	.88	Va.....	.65	.75
Ind.....	.78	.78	Wash.....	2.15	2.28
Mich.....	1.50	1.50	W. Va.....	.70	.76
Mo.....	1.13	1.17	Wyo.....	1.34	1.31
Mont.....	1.75	2.00			
N. Mex.....	1.57	1.46	Average....	1.07	1.01

The coke production in 1896 was 16,370,234 tons compared with 13,018,365 in 1895 and 8,540,227 in 1894. The enormous increase in 1895 over 1894 was due to the boom in the iron industry in the first named year. The subsequent falling off was due to the reaction which followed. The production in 1896 is considerably above the average of previous years.

In freight rates anthracite tonnage commanded better figures than in 1895; practically all other coal was carried much cheaper than in 1895. This was particularly the case in the Ohio region. The transporting companies which had been operating under a pooling arrangement slashed rates, ruining the year's business, and it was not until 1897 that they were brought back into line. During the middle of 1896 the tidewater soft coal roads operated under an agreement that promised at one time considerable stability. The average returns of the railroads were greatly lowered by the low figures at which freights were booked before the pooling agreement and the demoralization which followed the collapse.

Cannelsville coke commanded fair freight rates throughout the season. This was largely due to the fact that a control of the industry is held by one interest. For this reason there was only the minimum competition in the selling markets. Prices were well maintained and there was no incentive to cut freights.

An interesting compilation is that of the distribution of anthracite coal. A fact not generally known is that Pennsylvania, New York and New Jersey take about 62 per cent. of the total tonnage. The decrease in the shipments in 1896 as compared with 1895 were 3½ million tons. Of this amount about 2¼ million tons were in the

three states named. A table giving comparisons for the two years follows:

	1896.	Per ct.	1895.	Per ct.
Penn., N. Y., N. J.....	26,570,348	61.70	25,285,840	62.96
New England States.....	7,124,284	16.50	7,442,611	16.00
Western States.....	6,044,838	14.00	6,421,312	15.82
Southern States.....	1,846,000	4.23	1,872,390	4.02
Pacific Coast.....	17,680	.04	18,644	.04
Domino of Canada.....	1,350,000	3.02	1,253,876	2.70
Foreign Ports.....	224,355	.51	216,834	.46
Total.....	43,177,485	100	46,511,477	100

\* The difference between these figures and those in the table of production represents the amount of coal used at the mines or in the immediate vicinity.

The New York Legislature passed the bill enlarging the State Railroad Commission, after it had been amended so as to authorize one new commissioner instead of two, and after the clause reducing salaries had been cut out, but Governor Black, since the adjournment of the Legislature, has vetoed it. The Governor says:

"The commission has now three members, and its duties could be discharged by less. The expense is paid by railroads, but this affords no reason for increasing the amount. This bill emphasizes the disposition to create new offices for the sole purpose of filling them. The state tax, while not burdensome, is too high. Some commissions might well be abolished. The mania for new commissions is running wild. If legislation were enacted abolishing some I should be more favorable to it than I am to this bill. A commission should not be increased unless the commission is overworked or is intrusted with the expenditure of large sums of money. Neither of these conditions exist."

This commission bill as passed by the legislature contained the provision that one of the four commissioners must be a person "actually employed in the train service of a railroad," a provision undoubtedly put in to please "the railroad vote." As many of the men who know most about train service and about the interests of the men engaged in it are now in other occupations, having been promoted, this was a vicious restriction on the appointing power. The more a trainman knows about other departments of railroad work and about other business and industrial interests in general, the better commissioner will he make.

#### NEW PUBLICATIONS.

*Gas, Gasoline and Oil Vapor Engines.*—A new book descriptive of their Theory and Power; illustrating their Design, Construction and Operation for Stationary, Marine and Vehicle Motive Power. By Gardner D. Hiscox, M. E. New York: Norman W. Henley & Co., 6 x 9 in., pp. 280. Price \$2.50.

In the preface of this work the author calls attention to the entire absence of any literature on explosive motors as made in the United States, and informs the reader that this book has been prepared "for the general information of everyone interested in this new and popular prime-mover and its application to the increasing demand for a cheap, safe and easily managed motive power." With this design in view the treatment has of necessity been very general, and while the book may interest many readers, it will be of little service to designers, and the critical reader will doubtless be disappointed with the theoretical treatment of the subject.

The work would stand much higher in the estimation of engineers if the first part of Chapter II, on the Theory of the Gas and Gasoline Engine had been omitted. There is not enough theory given to be of practical service to the student, and a portion of it is vague, while some parts are misleading. Page 11 has been criticised in a review published by a contemporary, and since the review in question is misleading it would be well to point out the errors in the book. The first equation on page 11 is correct if the initial temperature be 32 deg. Fahr. and initial pressure be one atmosphere. In no other case, however, is the formula true. The equation following this one is likewise correct only for 32 deg. Fahr. initial temperature and one atmosphere initial pressure, so that the problem given in the book cannot be solved by either equation. The formulae marked I. and II. on the same page have no meaning whatever as stated. A parenthesis should be placed about "absolute temperature + acquired temperature," which is found in the numerator of both equations, and the word "acquired" should be read "final."

Formula I. comes from the equation

$$\frac{p v}{\tau} = \frac{p_1 v_1}{\tau_1}$$

where  $p$  = absolute pressure,  $p$  = atmospheric pressure,  $\tau$  = absolute temp. + final temp.,  $\tau_1$  = absolute temp. + initial temp. and  $v$  and  $v_1$  are any volumes which in this case are constant and therefore equal.

The above equation becomes then,

$$\frac{p}{\tau} = \frac{p_1}{\tau_1} \text{ or } p = \frac{p_1 \tau}{\tau_1}$$

In order to comply with the conditions given in the book,  $p_1 = 14.7$  when the temperature is  $\tau_1$ , then

$$p = \frac{14.7 (460.66 + \text{final temp.})}{460.66 + \text{initial temp.}}$$

The gage pressure =  $p - 14.7$ , as given in the book. We do not understand, moreover, why the author speaks of "leaving out a small increment due to specific heat at high temperature." Regnault concluded from many very careful experiments that there was no appreciable difference between the specific heat at low and at high temperatures. If the author has found any difference it would be of interest to know more in regard to it.

The short chapters on Explosive Engine Testing and Measurement of Power are well written, and with

a very elementary knowledge of mathematics the chapter on Heat Efficiencies will be readily understood. The short chapter on the Economy of the Gas Engine for Electric Lighting gives briefly some of the experiments that have been made during the past few years, and the results here given are very interesting. The following quotation will doubtless surprise the reader, but we are not in a position to disprove the statement because of the small amount of data which has been published on this subject:

"It has been known for some years that for equal light power but about one-half the volume of gas consumed in direct lighting will produce the same amount of candle-power when used in a gas engine for generating electricity for lighting."

Over 150 pages in the last half of the book are devoted to the description of about 40 engines, the larger part of which are made in the United States. From these descriptions and the engravings the reader may obtain a general knowledge, which may be supplemented by a critical study of the chapters on Governors, and Igniters and Exploders. Gas engines as applied to launches, bicycles and tricycles are also described. A list of patents issued in the United States from 1875 to 1896 is appended, and this will doubtless prove of service to inventors.

*The Manual of American Water-Works.* Edited by M. N. Baker, Ph. B., Associate Editor of *Engineering News*. New York: The Engineering News Publishing Co., 1897. Fourth issue, 8vo, cloth, pp. N + 611 + lxxv. Price, \$3.

This work, as its name indicates, is a book of statistics, financial, historical and technical data concerning the water-works in the United States and Canada. The body of the book consists of 611 closely printed pages, describing 3,341 water-works, supplying some 3,641 towns, 484 partial and unclassified works and 307 projected plants. These descriptions are clearly and carefully written, and all data are condensed by the use of abbreviations. The arrangement of the matter is simple and convenient, so that any information sought can be easily found.

The introduction to the volume, though occupying only 10 pages, contains some good general considerations on the data collected in the body of the book. A two-page table and the remarks which follow it give in detail the manner in which the total number of water-works given above is made up. The plants are given by States and groups, with the nature of the service, their ownership, their classification, etc.

Following this is some information on the ownership of works, from which we learn that of the 3,196 complete works in the United States, 1,690, or more than half, are owned by the municipalities which they supply and 1,489 by private companies, having 17 plants of unknown ownership. In Canada the public works are now over 75 per cent. of the whole, there being 109 public and 35 private plants, with one of unknown ownership. The change of ownership of the plants in the two countries is shown in two lists. One of these includes 200 cities and towns, in which the change has been from private to public, and the other, only 20 cities, in which the change has been the reverse. The tendency toward public control in the larger cities is very marked. Of the 50 largest towns in the United States, 19 have changed from private to public ownership, and only nine are now dependent upon private companies for their supply.

The introduction concludes with a few pages on the on the present tendencies in water-works practice.

At the end of the volume is a table giving the water rates charged in over 1,350 cities and towns in the United States and Canada.

*Report of the Massachusetts State Board of Health upon the Sanitary Condition of the Neponset Meadows in the Towns of Canton, Sharon, Norwood, Dedham, Milton and Hyde Park.* 8vo; cloth; X + 33 pages; 3 maps; State Printers, Boston, Mass.

This publication contains the report of the State Board of Health upon the sanitary condition of the Neponset Meadows, with recommendations for improving their condition. This is followed by a very concise and complete report by the Chief Engineer for the Board upon the former and the present condition of the Meadows, the pollution of the river and its present sanitary condition, feasibility of improving the sanitary condition and usefulness of the Meadows, and plan for draining the Meadows with an estimate of the cost. The engineer's report is followed by that of the chemist for the Board.

The problem considered is that of a very sluggish and crooked stream, polluted by wastes from manufacturing establishments and sewage, so that some 6,000 acres of meadow land is practically worthless for agricultural purposes and unhealthful for human habitation. The report states that there is about thirteen square miles of territory in this vicinity which is uninhabited, although within about eleven miles of the State House and favored with railroad transit into Boston.

The Board recommends the deepening and straightening the channel of the river for about nine miles, and straightening other portions where advisable, so as to prevent flooding the meadows in high flows in late spring and summer. The estimated cost of this work is \$125,000, irrespective of land and water damages. The Board also recommends such legislation as will prevent the entrance into the stream of sewage and manufacturing wastes which have not been satisfactorily purified. The amount expended by the Board in obtaining data, etc., for this report was \$2,994.



## TRADE CATALOGUES.

**Tie Plates.**—Messrs. Dilworth, Porter & Co., Limited, Pittsburgh, Pa., issue a pamphlet on "The Practical Use of Tie Plates in Maintenance of Way," by Mr. A. Morrison, C. E., who is connected with the tie plate department of that company. The pamphlet is worth reading. With the pamphlet comes a circular advertising the Goldie tie plate, from which we take the following report of tests made at the Pittsburgh Testing Laboratory, dated April 8, 1897. The report is signed by Mr. J. M. Bailey, Secretary.

## Compression and Adhesion Tests.

Name of tie plates.	Load applied to force plate into tie.	Load applied to pull plate out of tie.
Goldie No. 1, with Goldie p'ntd claw.....	4,680 lbs.	1,500 lbs.
Servis, 4 ribbed.....	12,620 "	467 "
New C. A. C.....	6,100 "	190 "
Wolhaupter, 4 ribbed.....	14,640 "	220 "
Goldie No. 2, with Goldie p'ntd claw.....	5,690 "	1,600 "

REMARKS.—Tie plates were tested on same white cedar tie—load being applied on T rail, base  $4\frac{1}{2}$  in. wide, to force plates into tie. The plates were then pulled out of tie by a  $\frac{1}{2}$  in. tap bolt screwed into middle of plate.

## Lateral Resistance or Spreading of Track Tests.

Name of ties.	Started to spread.	Spread $\frac{1}{2}$ in.
Servis, 4 ribbed.....	1,750 lbs.	1,750 lbs.
Goldie, with Goldie pointed claw.....	7,650 "	12,000 "
Wolhaupter, 4 ribbed.....	350 "	550 "
New C. A. C.....	1,120 "	3,390 "

REMARKS.—Plates were forced into the same white cedar tie, evenly. Tie was then placed on end, and plates were spread  $\frac{1}{2}$  in. No spikes or other fastenings were used in connection with the plates.

**Couplers, Buffers, etc.**—The Gould Coupler Co. issues its 1897 catalogue just in time to catch the Master Car Builders' and Master Mechanics' conventions. It is revised and enlarged, and contains illustrations and descriptions of the various devices manufactured by that concern. The company has recently built a new steam forge at Depew, N. Y., besides which it has malleable iron works at the same place, and steel works at Anderson, Ind. The capacity of the works at Depew is sufficient for 700 couplers, 20 vestibules and 20 platforms per day. Here are made the Gould couplers, the Gould vestibuled and continuous platform and buffer and locomotive pilot and tender couplers, together with a variety of malleable castings. The catalogue shows the Gould couplers by photograph and by detail drawings, also the tender couplers and buffers and the freight-car buffers. The Gould vestibule for tenders is illustrated, as are the vestibules for passenger cars, the continuous platform and buffer and the platform equipment for elevated railroads, which was recently described in the *Railroad Gazette*. Among illustrations of special castings for railroads, there is a malleable iron brakebeam designed to take the place of the ordinary wooden brakebeam without altering any of the detail attachments. Two pages of the catalogue are given to a very brief description of the Gould steel car axles.

**Automatic, Frictionless Side Bearing.**—The Chicago Railway Equipment Co. sends a pamphlet regarding the automatic, frictionless side bearing, of which the company is now the sole maker, under license from the inventor. In this bearing the rollers are made short, and so nested that they will adjust themselves to the difference in travel on the various radii. The rollers are fitted on loose axles, and each one travels independent of the other. The axles are set radially with the king-bolt, their function being simply to keep the rollers grouped, and to drive the roller frame. The rollers are automatically centered the instant the car tilts, or they are relieved of the load. This is accomplished by the use of two helical springs placed under the bearings, one being at each end of the roller frame.

We observe that in quoting from the *Railroad Gazette* of Jan. 25, 1895, the compiler of the pamphlet has added two short paragraphs, which we did not say, making no distinction between our text and his own.

## Building the Draw Span of the New Rock Island Bridge.

In our issue of Nov. 13, last, we gave a short description of the new bridge recently built by the Chicago, Rock Island & Pacific and the United States Government across the Mississippi River, from Rock Island to Davenport. The bridge is a double-track railroad and highway structure, the railroad deck being above the highway floor. Its total length is 1,850 ft., consisting of one approach span 98 ft. 9 in. long, one fixed span of 193 ft. 3 in., two of 258 ft. and three of 216 ft. 6 in. each, and a draw span 365 ft. 7 in. long. The roadway floor is 26 ft. wide in the clear, as is also the railroad floor.

In building the draw span, the general conditions imposed were that, while the use of falsework was permitted, no piles could be driven on account of the rock bottom of the river, the rock being at a depth of from 10 to 15 ft. below the average height of the water. Rail-

road traffic had to be carried on continually during the building, but the wagon traffic was abandoned. The draw span had to be built during the winter when navigation was closed, that is, from about Nov. 15 to the end of March; or, if the work extended into the navigation season, provision had to be made to allow boats to pass.

Before navigation closed in November, 1895, the falsework under the 98-ft. approach span, which carries only the railroad floor, spanning the wagon road approach to the bridge proper, and also that under the east arm of the draw, which is never used for navigation, had been built. So as soon as the river was closed the falsework in the west or navigable channel was placed in position. The falsework under both arms of the draw consisted of two stories of bents. The lower bents were made with eight legs and were about 35 ft. wide at the top and about 45 ft. at the base. Soundings were made and the legs of each bent made the right length for the different depths. No bottom sills were used, the lower ends of the legs being forced to bedrock through a thin layer of silt, which covers it. The bents were spaced about 16 ft. apart. The pony bents were about 16 ft. high. They were 8 ft. wide at the top, built of four legs, and were to support the old railroad floor with its single track. A big traveler, wide enough to straddle the new bridge, was built and placed over the pivot pier.

While this work was being done, the shopwork on the material for the new draw was just being begun, and it was uncertain when it would be finished, so the old draw was not disturbed. At last the contractor, the Phoenix Bridge Co., insisting on being allowed to proceed, permission was given on Dec. 23 to remove the old draw span, and proceed with the building of the new, according to the contractor's original erection plans. The old railroad floor was at once blocked up on the falsework, and the removal of the old draw begun. On Jan. 11 the work of removing the draw was finished.

In the meantime a change in the masonry of the pivot pier was being made. This was finished on Jan. 21. From that date until Feb. 3, 11 days passed waiting for material for the new turntable. At last it arrived, and work was pushed very rapidly on its erection. On Feb. 20 the first center post of the new draw was placed in position.

It will be remembered that, when the west arm of the draw was nearly finished, a part of the new work was wrecked by the ice carrying away the falsework, letting it fall into the river. This accident, together with the method of re-establishing the railroad traffic, which was interrupted by it, has been described by Mr. Ralph Modjeski, the engineer of the bridge, in a paper recently read before the Western Society of Engineers, as follows:

On Feb. 17 the temperature was 0 deg., and kept very low, reaching 6 deg. below zero on Feb. 20. The river was low. The prospects for the ice holding out for some time were, therefore, very good. On the 21st the four posts of the central tower were placed in position. The temperature was zero. It was then decided to erect the channel or west arm first, and in this manner to span the dangerous channel and prevent interruption of traffic. The channel near the shore under the east arm of the draw looked as if it would remain undisturbed even during a general breaking up of ice. The material to complete one arm of draw was on the way and expected to arrive on the 22d, which it did.

On the 23d the thermometer rose to 24 deg. above zero, the river remaining stationary. On the 23d the river took a sudden rise, thermometer reading 40 deg. above zero. This meant that the chances for a premature breaking up of ice were dangerously increasing, and as the first full panel of the west arm was being coupled up, it became apparent that the ice would move very soon. As a precaution, the ice around and on the upstream side of the falsework was cut out, this to give a better warning in case of the ice moving. Another precaution was to keep a heavy train of old gondola cars loaded with sand on the trestle whenever the track was unoccupied by regular trains. On the 24th the situation became more critical, the river having risen 6 in. more.

Retreat was now impossible as two full panels had already been coupled up. In two days the arm could be coupled up and be out of danger. The next morning, Feb. 15, the river was still rising and everything was pointing to a calamity. Nevertheless, work was being pushed with desperate rapidity. The ice was from 10 to 12 in. thick and near the bridge it seemed to hold out well, but about one mile upstream, on the rapids, it was broken up and began to move around, exerting an enormous pressure on the solid mass below. About 11 a. m. the calamity seemed unavoidable. Twelve hours more would save the trusses, 24 hours more would give time to support the track on the trusses and avoid interruption to railway traffic. Three double panels were coupled up, only one remaining to complete the arm.

At this critical period Mr. A. B. Milliken, in charge of erection for contractors, stationed a man on the upstream end of pier V in such a manner as not to be seen by the erecting gang on the traveler. This man was to observe the falsework and the ice and upon noticing the slightest motion in the body of ice to give a signal to the engineer of the hoisting engine to blow the danger whistle. During the lunch hour every man was made acquainted with the danger and instructed to get off the bridge when the whistle should blow. The men aloft were cautioned against getting down too hurriedly. They had just returned to their respective duties after the noon meal when at 12:40 the danger whistle was heard. Knowing that

the span could no longer be saved, the whole preoccupation centered itself on the men aloft who now descended one after the other, hurriedly but evidently with full presence of mind and without panic. Scarcely had the last man left the span when the mass of ice pressing against the falsework crushed it in on the upstream side and the traveler crumbled to pieces like a box of matches; then the steel followed with a rumbling noise. The whole mass fell on its upstream side, on top of the ice, which then carried it down with the current. The tower formed of the four center posts remained standing for a while after the rest fell and it looked as if it could be saved, although the rest of the structure remained attached to it by the top chord pins; but the pull was too great, and after swaying back and forth the two posts of the west tower-bent finally broke in two. The east bent remained standing; it was not connected to the top chord with the rest of the structure except by temporary sticks of wood instead of pins, which sticks easily broke. The falsework east of the pivot pier remained in place in spite of a considerable pressure of ice. This might have been due to the weight of the sand train.

The most serious consequence of this accident was the interruption to the railroad traffic. The problem of replacing falsework was made more difficult by the fact that the channel was almost entirely blocked with ice which formed practically a solid mass 10 to 15 ft. deep. Fortunately the wreckage was carried beyond the center line of bridge by the pressure of ice, so that very little, if any, of it remained in the place where the falsework was to go in. Working day and night, the trestle—as built in five days and on the fifth day the first train went over the bridge again. During this period of five days, the Rock Island road took care of their traffic over other lines.

As soon as the traffic was re-established, the contractors put divers at work and commenced clearing the channel of the wreckage. The channel had to be clear by the time navigation opened at about the end of March, or in about four weeks' time.

It was apparent that four weeks were not sufficient to replace the missing members of the new draw, to erect it and put it in turning condition. Several months would be required to accomplish this. It became necessary, therefore, to devise some means of taking care of navigation in a temporary manner. Several means were suggested, among others, a temporary draw and a pontoon bridge. The most practicable proved to be the one suggested by Mr. E. H. Connor, resident engineer, to build a temporary lift span. Plans were immediately prepared for the towers and the contractors proceeded with the construction. The Rock Island road happened to have a combination span on their road which was turned over to us for use on this occasion. This saved a great deal of time and material. The combination span was 147 ft. 5 in. long and accommodated itself very well to our problem. Nothing was changed in the combination span except additional braces were put in in the way of portals between inclined end posts. These end posts were also attached to the cast shoes by means of plates on each side bolted to both the shoe and the end post, and to the top chord by means of wooden braces. Two weeks after the wreck the erection of towers for lift span was commenced. The bents were framed on shore and taken out on barges.

The point of interest in the construction of the lift span is the simplicity and the success with which the suspension and lifting were accomplished. The design had to be simple so as to be quickly and easily constructed. The towers were built in two parts or stories, the lower part carrying the weight of the span and its moving load and the upper carrying only the weight of the span while lifting and forming guides for lifting. The lower part was constructed of three very strong bents braced together. The east tower rested on the river bottom near the pivot pier, the west tower rested on pier V. The top part destined to act as guide consisted of four 12 x 12 vertical posts, two on each side, which formed the guides proper; these were capped with 12 x 12 timbers transversely and 12 x 16 short timbers over each pair of guides, longitudinally. These longitudinal caps were to carry the lifting weight of the span. The vertical guide timbers were braced by means of inclined or batter posts to the lower part of tower in the east tower and attached directly to the end of the fixed span in the west tower. Two 8 x 16 timbers were placed transversely under the east end shoes of the lift span with ends projecting outside of the trusses. These timbers carried the dead load or lifting load of the span, and their ends were arranged to slide between each pair of vertical guide timbers. The suspension was accomplished by strong iron loops taking hold of the 8 x 16 timbers. Similar loops were attached to the longitudinal cap on top of the guide timbers. Two triple steel blocks with 15-in. sheaves were attached to the two bottom loops and one quadruple and one triple at the top. Five-eighth inch diameter steel cable was wound around the sheaves, making 13 strands at each corner of span. No counterweight was used. As the span weighed approximately 100 tons, the strain on each strand was 4,000 lbs., adding 25 per cent. for friction, this stress was 5,000 lbs. Two double cylinder double drum engines were obtained and placed, one on the fixed span over pier V, and one in the timber tower near the pivot pier. Each engine was to wind two cables, one from each corner of the corresponding end of the span. In order to make the lifting of both corners at each end uniform



the two drums were rigidly connected to engines by bolting up the friction cones. This made both drums revolve equally. The pull on each drum was about 5,000 lbs.

The towers were made of sufficient height to allow the span to be lifted 20 ft. 1 in., which extreme position gave 65 ft. 0 in. of clearance above low water or elevation 0.0 and 44 ft. 11 in. over highest water known. As will be seen, this clearance proved to be sufficient to let all boats pass. The highest water during the period of operating the lift span was 10.40, leaving a clearance of 54.6 ft.

Four weeks after the accident the combination span was swung and carried the first train over. The next day the lift span was raised 6 in. on one end for trial. On the following day both ends were raised 6 ft. successfully. In the meanwhile the falsework was cleaned out and on March 26, or one month and one day after the accident, we were ready to let the boats pass. We were only one day too early, as the first boat passed on the 27th. It took about one minute to raise the span and as much to lower it. In raising it the engineer on the east end gave the signals to the one on the west end. An indicator was arranged with wires and weights to show the principal engineer if both ends of the span were keeping on the same level, and as his engine was somewhat the more powerful one of the two he could adjust the motion of his end to that of the opposite end. But even if both ends were not level, there was enough play in the guides to prevent binding. The motion of the span was very steady, without any jars or jerks, and when being lowered on its supports it would come to bearing without the least shock. The lift span was operated successfully several times a day from March 27 until May 24, when the new draw was ready to swing into its place. From May 1 until the 21st the average number of lifts per day was 14.4. On two separate dates the number of lifts reached 25 per day.

Mr. Modjeski then proceeds to say a few words about the building of a new draw, which was done on the draw protection. There was nothing unusual about this. The turn table was found to be only slightly hurt, and after a few repairs was used again. One tower bent also survived the wreck. As to the material which fell into the river, it was not attempted to save a few pieces here and there, but every thing was re-ordered. The draw was ready to swing into place on or about May 21, and May 25 was the date set for this work.

The work to be done before the draw could be turned around was: the removal of the lift span, the removal of the old floor and falsework in the east arm of the draw, and the changing of track in the center panel of the draw span by turning it around 90 deg. It was decided to remove the lift span by lowering it on barges. The falsework and old iron floor in the east arm was to be removed panel by panel. The change of floor in the center panel was a simple matter. Three separate gangs were put to work so as to do these things simultaneously.

In the work of lowering the lift span the upper portion of the two towers, in other words the guides and their braces, also the engine in the tower next to pivot pier were first removed. This work did not interfere with the trains, but the disconnecting of the lifting device made navigation for high boats impossible. In this way the lift span became a fixed span resting on the lower portions of the wooden towers. Chains and slings, by means of which the lift span was to be lowered, were placed in position. The east end of the span was suspended from the tower of the new draw, the west end from top of the end posts of the adjoining old fixed span. On the other side of the pivot pier, the old floor system had been cut apart sufficiently to facilitate removing it panel by panel. At 7:35 a. m., just after the last train had crossed the bridge, a gang of railroad men began to remove the track and wooden stringers from the lift span. Soon after this was finished, the span was raised off the supporting towers with the temporary chains and blocks, and about 1:30 the west tower was pulled over into the river and was floated off. Twenty-three minutes later the east tower splashed into the water. It will be remembered that this tower was resting directly on rock and not on piles. At this moment the three barges prepared for carrying away the lift span, and pushed by two small steamers, were signaled to approach. The three barges were rigidly attached together and spread out so as to support almost the whole length of span. Two lines of stringers were placed on them, on which the floor beams of the span were to rest. The span was now suspended, and was being slowly lowered. When it reached a height of about 10 or 12 ft. from the water, the barges were steered under it and the span lowered until it rested on them. The slings and chains were removed, and the barges with the span floated away toward shore.

It took about 2½ hours of actual work from the time the span was stripped of its track to the time when it was sailing away. Temporary blocking was arranged at the end of the draw, as the end lift apparatus was not yet in working order. At 6:10 p. m. the draw was ready for trains. The actual time of interruption to traffic was 10 hrs. 35 min. The actual time that navigation was closed was 24 hrs. 20 min.

Besides the general conditions mentioned above there was one of some interest, and that was that the railroad grade had to be raised 2 ft. higher than the old one without interrupting the trains. The plan adopted to accomplish this was the following: To raise the adjoining 25-ft. fixed span 2 ft. at the end next to the draw, or over pier V making an incline of it, and at the same time to raise the track on the trestle to the required

height. This would allow the new floor to be placed in position much easier. The fixed span had to be raised off the pier at any rate to allow changing of masonry. The raising of the span weighing approximately 1,000,000 lbs. was accomplished by powerful jacks, using the pier as support for the end post, and two double bents, or timber towers, as support for the two first panel points. While the masonry on pier V was being changed, the span rested on the two double bents only, the end posts being supported by temporary diagonal rods from second panel point at the top chord to bottom of end post. Precautions were taken to have the end of the span blocked up on the masonry during the time when masons were not at work, otherwise the ice, which already had shown some points of weakness by moving slightly along the west shore, could have taken out not only the draw span falsework, but also the whole fixed span by breaking the supporting tower bents.

## TECHNICAL.

### Manufacturing and Business.

The J. A. Fay & Egan Co., of Cincinnati, O., has received an order to furnish the equipment for a large car shop at Iser, a suburb of Moscow, Russia.

The Universal Construction Co., of Chicago, has received an order for 1,000 tons of bridge material for Korea.

The Cleveland City Forge & Iron Co., of Cleveland, O., is making four rudder frames for the battleships Kearsarge, Kentucky, Illinois and Alabama.

F. B. Ward, formerly in charge of the Chicago office of the Brown Hoisting & Conveying Machine Co., has been appointed General Manager of the Michigan Brass & Iron Co., of Detroit.

The Holmes Metallic Packing Co. has been chartered in Pennsylvania with a capital of \$50,000. The directors and officers are: Cyrus Straw, William Sharpe, Thomas H. Holmes, J. C. Paine and William L. Connell. President, William L. Connell, Scranton; Vice-President, Cyrus Straw, Wilkes-Barre; General Manager, Thomas H. Holmes, Wilkes-Barre, and Secretary and Treasurer, William Sharpe.

The Erie City Iron Works, of Erie, Pa., has undertaken the manufacture of electric motors and generators.

The Toledo Railway Appliance Co., of Toledo, O., has been organized. Among other railroad supplies the company will manufacture a gravity dust guard for covering the opening in an air-brake hose when uncoupled. W. H. Stark, until recently Master Car Builder of the Wheeling & Lake Erie, and formerly with the Pennsylvania, is interested in the company.

The Alexander car replacer, made by the Alexander Car Replacer Manufacturing Co., of Scranton, Pa., has been adopted as standard by the Baltimore & Ohio.

It is stated that the Cleveland, Canton & Southern Railroad is looking into the various methods of loading coal by machinery, with a view to purchasing a new plant.

The St. Louis (Mo.) Iron & Machine Works has received an order from the Consolidated Steel & Wire Co., of Pittsburgh, Pa., for one tandem compound condensing rolling mill Corliss engine of 1,800 H. P. and one cross-compound condensing rolling mill Corliss engine of 2,200 H. P.

The King Bridge Co., of Cleveland, O., is building one of its improved 5-ton pneumatic traveling cranes for the Craig Ship Building Co., of Toledo, O.

Robert Ingraham Clark & Co., Ltd., of London, and Pratt & Lambert, of New York City, manufacturers of varnishes, have been consolidated under the name of Pratt & Lambert. Wm. H. Andrews, of Pratt & Lambert, will be General Manager. The company intends to give special attention to railroad business.

The Dickson Car Wheel Co., of Houston, Tex., has increased its capital stock from \$75,000 to \$150,000.

The Franklin Steel Casting Co., of Franklin, Pa., has contracted for an extension to its plant, which will be equipped with a 10-ton shore electric traveling crane. The company is doing a good business, especially in the coupler department, which is running double time.

The C. L. Pullman Car Co., of Chicago, has been incorporated to manufacture and sell street cars, by Charles L. Pullman, E. C. Pullman, G. E. Highley, H. J. Furber and George S. Steere. The capital stock is \$5,000,000.

Contracts have been let for the following equipment for the new power station of the South Side Elevated Railroad, Chicago: eight Babcock & Wilcox boilers having each a nominal horse-power of 500 and 4,000 sq. ft. of heating surface. The Babcock & Wilcox chain grate will be used and the boilers will have wrought steel headers; four Allis cross-compound condensing engines, each rated at 1,200 H. P., but capable of developing a maximum of 2,000 H. P. The Westinghouse Electric & Mfg. Co., of Pittsburgh, Pa., will furnish four 800 KW. direct connected generators. The voltage at the terminals will be 650 volts.

The Wheatland Rolling Mill Co., Cheyenne, Wyo., has been incorporated in that state with a capital stock of \$50,000. The incorporators are Joseph M. Carey, Louis Kirk and J. B. Boyer.

The contract for the hot and cold mills for the new plant of the National Tin Plate Co., at Fordham, Pa.,

has been given to the Leechburg Foundry & Machine Co., of Pittsburgh, Pa. There will be two trains of four hot mills each, and nine cold mills.

### Iron and Steel.

The iron market shows signs of improvement, especially as to Bessemer pig. Sales last week aggregated 33,000 tons, with prices \$9.25 to \$9.50. There is no change in the steel rail market.

It is reported that the plant of the Akron (O.) Iron & Steel Co. is soon to be closed. A part of the shops have already suspended work and the mill is now operated only in the shuffling department. Insufficient working capital is given as the reason for the shutdown.

The Hecla Iron Works Co., Brooklyn, N. Y., has been recently incorporated with a capital stock of \$225,000. The Directors are: Niels Poulsen, Charles M. Eger, of Brooklyn, and B. Edward Fils, of New York City.

At a recent meeting of the Directors of the Scranton (Pa.) Steel Co., it was decided to distribute pro rata among the shareholders the \$750,000 of stock of the Lackawanna Iron & Steel Co., received as a part of the purchase price when the plant of the Scranton Steel Co. was bought by the Lackawanna Iron & Steel Co.

The new mill of the Carnegie Steel Co. at Duquesne, Pa., is being used as a finishing mill for steel rails. With this mill and the two in Braddock the company has a daily capacity of 2,000 tons.

The Burgess Iron and Steel Co., of Portsmouth, O., is making a number of improvements in its plant, including a new open-hearth furnace.

Work has been resumed in all departments of the Portage Iron Works at Duncansville, Pa.

### New Stations and Shops.

The warehouses of the Southern Railway at Pinners Point, Va., which were completed last year, have been so crowded with freight, and the foreign shipments of the company have become so heavy that it has been found necessary to provide more facilities for handling the business. A new warehouse and wharf 252 x 700 ft., and two slips about 200 x 800 ft. are to be built, and it is expected that they will be completed by Oct. 1.

The Atlanta & West Point has prepared plans for a new passenger station at College Park, a suburb of Atlanta, Ga., and contracts will probably be let shortly. The depot will be 138 x 35 ft., of stone and buff brick and one story high. The roof will be of metal shingles and all interior decorations in wood. No plastering will be used. It is expected to complete the building within two months.

A contract has been let by the San Francisco & San Joaquin Valley for a new combined freight and passenger station at Hanford, Cal. The building will be of brick and cost about \$10,000.

Bids have been asked by the Oregon Short Line for a new passenger station to be built at Farmington, Utah. The building will have a stone foundation with a frame superstructure.

### The Scotch-Irish Tunnel.

A fantastic scheme is being discussed in newspapers and at meetings for the construction of a submarine tunnel between Ireland and Scotland. Its length would be about 20 miles; it would need to be carried about 1,000 feet below sea-level in mid-channel, and its cost would be anything from \$40,000,000 upward. The traffic would probably not do more than cover working expenses, for the mouth of the tunnel on the Scotch side would be in a remote, thinly peopled part of the country, 80 miles from the nearest center of population. A rate per mile low enough to draw the traffic away from the existing steamboat services would be so low that it would hardly pay interest on the vast construction capital, even if the tunnel were as full of trains as the London "Underground."

### THE SCRAP HEAP.

In the state of New York, train wrecking, if it results in death, is now a capital offense.

The Delaware Legislature has rejected by a vote of 11 to 10 a bill to create a railroad commission.

It is stated that the Chicago, Rock Island & Pacific will subscribe \$20,000 toward the expenses of the exposition to be held at Omaha next year. The Chicago, Milwaukee & St. Paul has subscribed \$10,000.

Judge Amidon, at Fargo, N. Dak., has, on application of the railroads, issued a temporary injunction against the establishment of the reduced tariffs recently prepared by the State Railroad Commissioners.

The United States Court at Omaha has issued a final order in the Union Pacific telegraph litigation, directing that the Western Union wires, property and business must be separated from the road by Sept. 1. The Postal Telegraph Co. appears to be ready to secure rights over the Union Pacific road as soon as possible.

The Governor of New York has signed the law providing for the gradual abolition of highway grade crossings. The law is somewhat similar in principle to that of Massachusetts, though considerably different in various details. The amount to be paid by the state toward improvements under this law is limited to \$100,000 annually.

In the suburbs of Tacoma, Wash., on May 21, a masked man stopped an electric street car and entering it with a pistol began robbing the five passengers. But the Superintendent of the road, who was in the baggage com-



partment, attacked the robber and after a number of shots succeeded in killing him. The Superintendent and one passenger were wounded by the robber's pistol, and the former will lose one of his arms.

A St. Louis paper reports that a man in that city has fitted up a traveling sample-room or store for commercial travelers, and that it has started out on a trip over the Cleveland, Cincinnati, Chicago & St. Louis. Drummers of different trades engage compartments in the car and an itinerary specifying the stopping places and the amount of time to be allowed at each town is made up and agreed upon before the trip is begun. There are sleeping and cooking facilities on the car.

#### Railroad Taxation in Michigan.

The Railroad Commission of Michigan reports that the state taxes to be paid by the railroads of that state for the last fiscal year amount to \$740,898. A bill now before the Michigan Legislature proposes an increased rate, under which the amount of taxes would be over \$1,200,000 a year.

#### The Lennon Case.

The decision of the Supreme Court of the United States in the Lennon case is simply that the lower court did not exceed its jurisdiction when it issued an injunction requiring Lennon to perform his duties. No other question in the case was brought before the Supreme Court. The origin of the case was during the celebrated Ann Arbor strike of 1893. Lennon was an engineer of the Lake Shore road, and he refused to move cars coming from the Ann Arbor. The district court had issued an injunction requiring all whom it might concern to act without discrimination with regard to business coming from the Ann Arbor company. Lennon disobeyed the injunction. He was arrested for contempt of court and fined. The case was appealed, and is now finally settled by the court of last resort. The decision is simply that the district court did not transcend its powers; so the one fact is thus declared that so long as a man remains in the employ of a company he is bound to carry out orders, and if he shall refuse the courts can compel him to do so.

The lower court distinctly declined to express any opinion as to an employee's right to summarily leave the employment of the company, to avoid handling cars of a boycotted road. Suppose that Lennon, instead of refusing to move the Ann Arbor cars, had sent in his resignation by wire, and abandoned his locomotive at that point, without completing the trip which he had begun? The lower court intimated that the right to stop work in the midst of a run would depend upon the circumstances of the case. Lennon was in the road's employ, and refused to perform the duty assigned. Men who desire to go upon a sympathetic strike in such cases, must first sever their connection with their employers, if they wish to be beyond the jurisdiction of the courts.—*Toledo Blade*.

#### Big Prices for Old Railroad Guides.

We have several times called attention to the interest, ing catalogues issued by Mr. Edward Baker, bookseller, 14 and 16 John Bright street, Birmingham, England—who is a very successful collector of material relating to the history of railroads. We have just received from him a circular containing a remarkable offer for early copies of *Bradshaw's Guide*. He wishes to buy the first nine copies, beginning with December, 1841, and including August, 1842. For the first one he will pay 6 guineas, for the last one 3 guineas and for each of the others 5 guineas, making 44 guineas for these nine copies. For two later copies he offers 6 guineas.

#### The Cotton Crop of 1896.

The statements furnished the Department of Agriculture by all the railway and water transportation companies show that from Sept. 1, 1896, to Feb. 1, 1897, the total actual movement of cotton from the states of production to ports, Northern and Western mills, Canada, Mexico, and all other destinations, amounted to 6,517,126 commercial bales. Reports from the officials of all but five of the Southern mills show actual purchases taken from the current crop of 560,114 bales. The five miles not heard from purchased during the same period last year 2,413 bales. The department's agents show that on Feb. 1, 1897, there remained on plantations 362,298 bales; in warehouses, 598,727; at public gins, 161,569; at compresses, 241,344; and at depots and yards, 130,421, making the total amount held on plantations and in interior towns, not including any cotton held at ports, 1,494,329 bales. Among the changes in the past few years in the export movement of cotton, those that have taken place at points on the Pacific Coast and at Pensacola are most worthy of notice. The exports from San Francisco to Japan for the first five months of the season, 1895-96, were 20,640 bales, against 25,257 the same period of the present season. The exports from Puget Sound to Japan for the same months in 1895-96 were 2,000 bales, against 13,000 in 1896-97, 5,850 of which passed through Tacoma and 7,240 through Seattle. This shows an increase in the exports to Japan of 25,707 bales in the first five months of the present season. All of this cotton is reported as having been forwarded from interior Texas points. The export movement from Pensacola has increased from 17,910 bales during the entire season of 1895-96—in which year the movement first began—to 54,225 bales during the first five months of the present season, 48,239 of which were forwarded from interior Alabama points (47,389 to Liverpool and 850 to Mexico).

#### Electric Traction in New York City.

For several weeks past the Eighth avenue road, which is operated under lease by the Metropolitan Traction Co., has been deterred from changing its motive power to electricity by the action of several citizens who have brought suits (in all amounting to about twenty six) to obtain an injunction restraining the Commissioner of Public Works from granting a permit for beginning the work of changing the motive power on the line. Judge Beach, in the Supreme Court, has denied two of the more important of these injunctions. He holds that the consent of the city is not necessary for a change of motive power, and also held that the city by its failure to assert any right in regard to buying the Sixth and Eighth avenue lines at a 10 per cent. advance above the cost price has shown that their understanding of the contract between them and the railroad company did not include any agreement for the sale of the road on the terms mentioned. The case will doubtless be appealed to the Appellate Court, in which case an opinion may be expected by July.

#### Trolley Roads in Glasgow.

After most elaborate investigation by engineers and other officials, and also by deputations which visited America and Continental Europe, the Glasgow Corpora-

tion has now decided to equip the Springburn route section of its tramways with electrical power, the overhead trolley system being used. During the various discussions on the repeated recommendations of the Tramway Committee the trolley system was most strenuously opposed, but it now appears that a great deal of this feeling has been overcome, and this section will be equipped at a cost of something like £9,000, as an experiment in the first instance. Whether or not the whole of the Glasgow Corporation tramways are to be worked by the same power depends upon the success or failure of this experimental line.—*The Practical Engineer*.

#### A Valuable Package of Freight.

The great lens for the telescope of the Yerkes Observatory at Lake Geneva, Wis., which has been in process of finishing at Prof. Clark's establishment in Cambridgeport, Mass., for the past five years, was taken to Chicago last week in a parlor car, the whole car being devoted to this one package of freight. The lens, weighing with its frame about 1,000 lbs., is packed in double boxes with springs between the walls of the inner and outer casing, and it was loaded in the center of the car in order to place it where it would be the least liable to damage from vibration. Watchmen were stationed at both ends of the car. This lens is the largest in the world. It represents nearly six years of labor, and is valued at \$60,000. The glass came from France, in May, 1892, and its cost in the rough was \$20,900. The lens is 41½ in. in diameter, and weighs 515 lbs. The aperture is 40 in.

#### Train Accident in Germany.

On May 19 a train loaded with soldiers was wrecked between Hillesheim and Gerolsheim, near Cologne. Nine soldiers were killed and 35 injured. Press dispatches state that the wreck was caused by the train breaking in two, the rear portion afterward running into the forward one.

#### Central Argentine Railway Extension.

A contract has been made between the Department of Engineers of the Argentine Republic, South America, and the Central Argentine Railway Co. for an extension of the road from Pergamino, Province of Buenos Ayres, northwest to Melincué, Province of Santa Fe, a distance of about 65 miles. The plans and construction of the road are to be inspected by the Department of Civil Engineers of the Government. The company must present the plans within six months from the signing of the contract and begin building within three months after the plans have been approved, the line to be finished within two years after.

#### For Populist Railroads.

The Arkansas Senate has passed the bill authorizing the building of a state railroad with convict labor. The Governor, Secretary of state, Auditor, Attorney-General, and Commissioner of Mines, Manufactures and Agriculture are created a state Board, with power to project railroads for the State of Arkansas. The bill says: "It shall be the duty of the board to open subscription lists for the donation of funds or property to be used for preliminary work and construction. It shall outline as nearly as possible a north and south and east and west line of railroad through the state, or such other lines as it may see fit to locate, and shall give notice in such a manner as it may deem sufficient of its readiness to accept donations of money or property to be used in preliminary or construction work. Whenever the donations or public subscriptions for a line of railroad designated by the board shall be adjudged by it to be worth the sum of \$100,000 in cash, the board shall accept said donations and said subscriptions."

#### LOCOMOTIVE BUILDING.

The Pennsylvania Railroad will build five large freight engines at its own shops.

The Dickson Mfg. Co., of Scranton, Pa., is building a small switch engine for the Midvale Steel Co., with 12 x 18 in. cylinders.

The Government of Japan is asking for bids on 18 American type locomotives for use on the Imperial railroads. The specifications call for delivery at Yokohama within a year.

The Pittsburgh Locomotive Works is building two engines for the Union Railway, a branch of the Pittsburgh, Bessemer & Lake Erie, connecting the Duquesne, Braddock and Homestead works of the Carnegie Steel Co.

We understand that bids are being asked for two locomotives for the Korean road, now under construction from Chemulpo to Seoul, a distance of about 25 miles. Mr. H. Collbran, representing interests building the road, is now in this country and is expected in New York City May 28.

The Boston & Maine has placed an order with the Manchester Locomotive Works for six passenger engines with 19 x 24 in. cylinders and 72 in. driving wheels, similar to the one described in our issue of June 19, 1896; six 6-wheel switching engines with 18 x 24 in. cylinders and six 10-wheel freight engines with 19 x 26 in. cylinders.

#### CAR BUILDING.

The Pullman Palace Car Co. is building two passenger cars for the Kansas City, Pittsburgh & Gulf.

The Pittsburgh, Bessemer & Lake Erie has leased 500 flat cars from the Western New York & Pennsylvania.

The Universal Construction Co., of Chicago, has received an order for 20 narrow gauge steel cars for shipment to Venezuela.

The Billmeyer & Small Co., of York, Pa., has received an order from the Spanish Government to build four passenger cars for use in Cuba.

The Ohio Falls Car Mfg. Co., of Jeffersonville, Ind., is building four coaches, two chair cars and a private car for the Detroit, Lima & Northern.

The Northern Pacific has finished building 100 new flat cars at its South Tacoma (Wash.) shops. The cars are equipped with M. C. B. couplers and air brakes.

The Newfoundland, Northern & Western, a government road in Newfoundland, has ordered three passenger cars from the Barney & Smith Car Co., Dayton, O.

The Sierra (Cal.) Railroad (referred to in the Railroad Construction column of this issue has ordered two passenger cars from the Jackson & Sharp Co., of Wilmington, Del.

The St. Louis, Peoria & Northern has ordered 100 box and 20 stock cars from the Terre Haute Car & Mfg. Co., of Terre Haute, Ind., 200 coal, six dump and three ca, boose cars from the St. Charles Car Co., St. Charles, Mo.,

and two passenger, two combination sleeping and reclining chair cars and one baggage, mail and express car from the Barney & Smith Car Co., Dayton, O.

The Wason Mfg. Co., of Springfield, Mass., is building two passenger cars for the Mount Tom electric road.

The City Passenger Railway Co., of Baltimore, Md., is building a number of electric cars for its Charles street line.

The National Railway Co., controlling a number of electric and cable roads in St. Louis, Mo., is asking bids on 80 passenger cars. These are to be 28 ft long, with cross seats for 40 passengers. The order will probably be placed with either the American Car Co., Brownell Car Co., Laclede Car Co. or St. Louis Car Co., all of St. Louis, Mo.

#### BRIDGE BUILDING.

**Albany, N. Y.**—The Governor has signed appropriation bills for a bridge over the canal at Canajoharie, \$5,000; for a hoist bridge at Whitesborough street over the canal, \$5,000 by the state and \$10,000 by the city of Utica; for a bridge at Broad street, Utica, \$5,000, when the city agrees to give \$10,000; for a bridge at Hamilton street, Buffalo, over the canal, \$10,000; for a bridge at Salina street, Syracuse, \$18,000, when the city appropriates a like sum; for an iron foot-bridge over the canal at Sixth street, Watford, \$2,000; for a bridge at Fourth street, Watford, \$4,000; for a bridge at River street, Fort Plain, \$14,000.

**Baltimore, Md.**—Three new bridges are to be built this summer on the main line of the Baltimore & Ohio, between Relay and Washington Junction. W. F. Manning, Chief Engineer.

**Dennison, O.**—The contract for the iron bridge over Stillwater Creek, between here and Ulrichville, has been given to the Wrought Iron Bridge Co., at \$2,785.

**Franklin, Pa.**—The County Commissioners have located a bridge across the east branch of Sugar Creek at Diamond.

**Grafton, W. Va.**—During the coming summer the Baltimore & Ohio will build seven new steel truss bridges on the line between here and Parkersburg. They are Nos. 33 and 35, between Cornwalls and Cairo; Nos. 48 and 49, between Walkers and Kanawha Station; No. 31, east of Cornwalls, No. 21, at Smithton, and No. 22 at West Union.

**Greensburg, Ind.**—Bids are asked June 11 for a 120-ft. steel bridge, also for the substructure for the same. Colman T. Pleak, County Auditor.

**Harrisburg, Pa.**—It is reported that bids will be opened by the Board of Public Buildings and Grounds, on June 15, for a bridge across the Susquehanna River at Catawissa, to replace the one swept away.

**Lewisburg, Pa.**—The Grand Jury has approved the viewers' report for the rebuilding of a county bridge over Laurel Run, in the Village of Milmont in Hartley Township.

**Nashville, Tenn.**—It is said that the Louisville & Nashville has decided to build a new double-track bridge across the Cumberland River at this place on the site of the present bridge, work to be begun next fall.

**Plainfield, N. J.**—At a joint meeting of the Somerset and Union County Boards of Freeholders to consider the building of line bridges over Watchung and Sycamore avenues, it was decided to grant the former bridge, which will be of two spans and about 100 ft. long.

**St. Paul, Minn.**—The United States Senate has passed a bill authorizing two railroad bridges across the Mississippi River at or near this place.

**Scranton, Pa.**—The County Commissioners have located bridge sites in Greefield, Scott and North Abington at places where the Grand Jury has decided that bridges should be built.

**Sharpsville, Pa.**—A petition from citizens of this place, asking the Court to grant a mandamus on the County Commissioners to compel them to build a bridge previously located, has been presented at Mercer.

**Wilkes-Barre, Pa.**—The Court has ordered that the bridge crossing the Lehigh Valley on North Washington street be replaced by another, and that the Wilkes-Barre & Suburban Street Railway pay \$1,000 toward the new bridge, the balance being paid by the railroad.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Powers, Liabilities and Regulation of Railroads.

In California it is held that under the statute making it a felony, to throw a switch, etc., with intent to derail any train, or board any train with intent to rob it, etc., an indictment charging defendant with throwing a switch with intent to derail a passenger train, "and" boarding a passenger train with intent to rob the same, charges the single offense of train wrecking; and it is error to direct a conviction if defendant boarded an express car, and, by putting in fear the messenger, stole anything in his custody, where the evidence shows that, if he entered the car, it was after it had been derailed.

In Kentucky a suit will lie at the instance of a railroad for the removal of timber standing in such proximity to its right of way as to endanger the safety of passengers.

In the Federal Court it is held that a railroad authorized by its charter to build a "3-ft., standard narrow-gauge railroad" cannot broaden its tracks to the standard gauge without the consent of a city through whose streets the tracks are laid, even though the city ordinance granting the use of such streets to the company did not specify any gauge. The charter and ordinance should be construed together.

In Illinois, smoke and noise incident to the operation of a railroad do not constitute a nuisance, so as to authorize the city to compel the removal of the tracks from the streets.

In this case it is also held by the Supreme Court that the fact that the use by a stock-yards company of its tracks for transporting cattle constitutes a nuisance, by reason of the stench arising therefrom, does not authorize the city to remove the tracks from street crossings, where the company was authorized to also use the tracks for the transportation of other freight.

In Arkansas a railroad company's directors passed a resolution that it "proceed immediately to build (and operate) a railroad beginning at or near B. in W. County, running thence through the counties of . . . to Fort Smith; . . . also a branch from the main line of (the company) at some point, to be hereafter determined, in C. or W. Counties, Arkansas, running thence north . . . to a connection with its branch



above described. . . . Resolved, further, that the President is authorized to put under construction and make the necessary contracts for such portions of the foregoing roads as his judgment may approve." The Supreme Court rules that the resolution authorized the President to construct the branch line from Ft. Smith to the point on the main line in C. or W. County, before building the line from B., so as to authorize condemnation proceedings for that purpose.<sup>1</sup>

In Texas, the defendant, after constructing its road across plaintiff's land, in doing which it made a ditch which formed a receptacle for and held water, obtained a deed of the right of way, conditioned that, if the company fenced its right of way, it should be so constructed that cattle kept in the pasture could have the full use of the water in the ditch, the habendum clause being: "To have and hold . . . the strip of land . . . hereby conveyed, except as agreed in regard to fencing the right of way, unto the said . . . railway company." The Supreme Court holds that defendant could not drain the water from the ditch, though it injured its road-bed.<sup>18</sup>

#### Injuries to Passengers, Employees and Strangers.

In Texas it is held that in an action against a railroad for the death of a drunken man run over after being ejected from a train, a charge to find for plaintiff if the death "was caused by, or was a natural and probable consequence of, his being ejected by the conductor in such condition," is erroneous in not limiting the liability to the "natural and probable consequences" of the ejection.<sup>6</sup>

In Texas it is not negligence *per se* to assist one to get on a moving train.<sup>7</sup>

In New York it is not negligence *per se* for a passenger to ride on the front platform of a street car.

In Texas, in an action by a brakeman to recover for injury caused by an alleged defect in the track at a place where he was engaged in making a coupling, evidence that another railroad company maintained its track in a similar condition is irrelevant.<sup>8</sup>

In Indiana it appeared that plaintiff's intestate was injured by reason of an unknown defect in the drawbar of a foreign car, which he was attempting to couple to defendant's engine. A special verdict further found that the defendant maintained a resident car inspector to inspect all cars before placing them in the trains of defendant; that he inspected said car hurriedly, without tools, occupying not to exceed five minutes in said inspection; and failing to discover the condition of the drawbar; that to have made an efficient inspection would have required 10 minutes; that with no other inspection, said car was ordered into said train; that the defective condition of said drawbar could have easily been discovered by a reasonable inspection, but said inspector did not make the same, and it had not been shown by the evidence that said inspector was sufficiently skilled and competent to make the same. The Supreme Court rules that the facts recited failed to show that the inspection was not all that the requirements and exigencies of the traffic would permit.<sup>10</sup>

In another case in the same state it is held that while evidence that inspectors of engines employed by a railroad company were competent, that an engine which collapsed, resulting in the death of an employee, was inspected and found in good condition three days before the accident, tends to show due care on the part of the company, evidence of the condition of the engine after the accident is admissible, and a jury may be warranted in finding therefrom that the report of the inspector as to its condition was incorrect, and that the inspection was not carefully made.<sup>11</sup>

In Kansas it is held that a collision between a switch engine and a push car standing near the track occurred because of the negligence of the engineer and the switchman on the engine was for the jury, where the engineer saw the car when within 50 ft. of it, and could have stopped before reaching it, and his only excuse for not observing its dangerous proximity to the track was that his view was obstructed by the switchman, who stood at the footboard of the tender in front of him as the engine backed toward the car, and the switchman might have seen the car had he been looking ahead.<sup>12</sup>

In Texas in an action by a conductor against a railroad company, for injuries caused by the negligence of R., another conductor, plaintiff testified he did not know, prior to the injury, that R. was incompetent. The evidence showed that such was R.'s general reputation among defendant's employees, and that plaintiff and R. were acquainted. A witness for plaintiff, on cross-examination, stated that, on a former trial, he testified that, before the injury, he heard plaintiff mention R.'s reputation as a reckless conductor, and that he could not tell, at the time of the second trial, whether it was before or after the injury such conversation occurred, as it had been two or three years. Plaintiff testified it was after the accident, and that he never recommended R. as a conductor to W. W. testified that, at the time he appointed R., he was recommended as conductor by plaintiff. The Supreme Court rules that there was legal evidence that plaintiff had knowledge, before the accident, of R.'s incompetency.<sup>13</sup>

In Nebraska, in an action for injuries received in a crossing accident, an instruction that a failure of defendant either to ring the bell or blow the whistle at a distance at least 80 rods from the crossing rendered it criminally liable was reversible error, the statute merely imposing a penalty.<sup>14</sup>

In New York, the Court of Appeals holds that where a miscarriage results from from freight caused by the negligence of a railroad, such negligence is not the proximate cause of the miscarriage.<sup>15</sup>

In New York a street railroad company is not chargeable with negligence where an employee of an independent contractor, while in a trench under the track, repairing it, was injured by a passing car in charge of railroad employees, who did not know that any one was in the trench.<sup>16</sup>

In New Jersey it is the duty of the managers of an electric street car going at a high rate of speed to give audible signals of the car's approach, the non-performance of which is evidence of negligence.<sup>17</sup>

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Boston & Maine*, quarterly, 1½ per cent. on common stock, payable July 1.

*Catawissa*, 2½ per cent. on preferred stock, payable May 19.

*Central Massachusetts*, 75 cents on preferred stock, payable May 20.

*Chicago, Burlington & Quincy*, quarterly, 1 per cent., payable June 15.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Chateaugay*, annual, Plattsburgh, N. Y., May 29.

*Chicago, St. Paul, Minneapolis & Omaha*, annual, Hudson, Wis., June 5.

*Des Moines & Fort Dodge*, annual, Des Moines, Ia., June 3.

*Mexican Northern*, annual, 42 Pine street, New York, June 1.

##### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Association of American Railway Accounting Officers* will hold a convention at Richmond, Va., on May 26, 1897.

The *Association of Railway Claim Agents* will hold its convention at St. Louis, Mo., during the last week of May, 1897.

The *Canadian Electrical Association* will hold its convention at Niagara Falls, Ont., June 2, 3 and 4. Hotel Lafayette will be the headquarters of the association.

The *Master Car Builders' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 8, 1897.

The *National Association of Local Freight Agents' Associations* will hold a convention at Washington, D. C., on June 8, 1897.

The *American Railway Master Mechanics' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 15, 1897.

The *National Association of Car Service Managers* will hold a convention at Boston, Mass., on June 16, 1897.

The *Association of Railway Telegraph Superintendents* will hold a convention at Niagara Falls, N. Y., on June 16, 1897.

The *Ohio State Tramway Association* will hold its next meeting at Columbus, O., on June 15.

The *Train Dispatchers' Association of America* will hold its tenth annual convention at Detroit, Mich., on June 22, 1897.

The *American Society of Railroad Superintendents* will hold its next meeting at Nashville, Tenn., beginning Sept. 22.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds its formal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7:30 p. m.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month, except June, July, August and September.

The *Denver Society of Civil Engineers* meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

##### Car Inspectors' Protective Association.

The fifth annual convention of this association was held in Boston, May 18. The association will hold its next meeting at Toledo, O., in May, 1898. These officers were elected: Supreme Chief, J. B. Dunkin, Collingwood, O.; Secretary, F. W. Lancaster, New York; Treasurer, T. D. Davis, Columbus, O.

##### Engineers' Society of Western Pennsylvania.

The regular monthly meeting was held in the rooms of the Society, 410 Penn avenue, Pittsburgh, Pa., Tuesday evening, May 18. A paper on "High Frequency Currents and X Rays" was read by Mr. N. W. Fisher and illustrated by electric experiments. The attendance was large, and the discussion was participated in by Messrs. C. F. Scott, John Braslar and others.

##### Old Point Comfort Conventions.

The New York, Philadelphia & Norfolk Railroad has issued a handsome circular in connection with the annual conventions of the Master Car Builders' and Master Mechanics' Associations, to be held at Old Point Comfort, commencing June 8, giving the time table of trains and connections to and from Old Point. There will be two trains each way daily, except Sunday, and a special rate has been made for the occasion.

##### Local Freight Agents' Association.

The National Association of Local Freight Agents' Associations will hold its annual meeting in Washington, D. C., June 8. Among the topics to be discussed are the abuses attending shipments of freight to order; piece work, clerical and labor, in freight stations; restrictions on the shipment of bonded freight; uniformity in fast freight line guide books, and the recovery of grain doors of cars delivered to elevators. One of the essayists on the first named subject will suggest that there should be a special bill of lading, way bill and expense bill for shipments consigned to order.

##### Partnership for the Protection of Palace-car Porters.

It is some time now since a railroad brotherhood has been started, and we have been anxiously wondering what class of employees would next catch the annual-convention-with-round-trip-pass fever. Massachusetts and New York papers this week report the incorporation in both those states of the "New York, New Haven & Hartford Railroad Porters' Association," the headquarters of which are at New York City. The object is the promotion of the welfare of the porters employed by palace and sleeping-car companies. A number of coun-

try editors, being hard up for copy for the comic column, and having vividly in mind the extortions sometimes perpetrated by porters, have jumped up with the suggestion that it will now be necessary to form an Association for the Protection of Passengers who Patronize Palace and Sleeping-Car Companies. This is, of course, only a joke. No porter ever got a tip out of a country editor, and by this time the futility of even attempting to get one must be universally understood. Moreover, most porters are above taking a mean advantage of an editor riding on a pass; though it must be admitted that there are a few black sheep in every flock.

##### Engineers' Club of St. Louis.

The last regular meeting was held at 1600 Lucas place, St. Louis, Mo., Wednesday evening, May 19. Mr. H. A. Wagner delivered an address on "The Electric Lighting System of the City of St. Louis." A review was given of the history of the lighting industry in that city, and the present condition was described. Changes are now being made so that all lights may be supplied from one kind of dynamo. Twelve hundred arc lamps are now being operated from one alternating current dynamo, and the other arc lights are rapidly being changed to operate on alternating current circuits. Step-up transformers are used, and as many as 60 arc lights are operated in series on one alternating circuit. The same generator may be used for arc and incandescent lighting. Mr. Wagner gave a short sketch of the underground work now being installed. For commercial lights the plan is to use high tension mains and distribute at low tension on the 220-volt, three-wire system, from transformers placed in the manholes. The discussion which followed was participated in by Messrs. Kinnealy, Flad and Barth. Mr. Barth then exhibited a wooden surface illustrating a problem in the calculus and gave a short discussion of the matter.

#### PERSONAL.

—Mr. J. D. Grogan has been appointed Chief Train Dispatcher of the Little Rock & Memphis.

—Mr. Charles W. Frisbee, General Auditor of the Peninsular Railroad, died suddenly at Skykomish, Wash., on May 23.

—Mr. Henry C. Burt has been elected a Director of the Fremont, Elkhorn & Missouri Valley, to succeed Mr. W. H. Newman.

—Mr. John M. Graham has been elected a Director of the Flint & Pere Marquette to succeed Mr. W. H. Tousey, deceased.

—Mr. J. A. Rhombert, President and General Manager of the Dubuque (Ia.) Street Railway, died at his home in Dubuque on May 17.

—Mr. J. L. Hohl has been appointed Traveling Freight Agent for the Chicago, Burlington & Quincy, with headquarters at St. Joseph, Mo.

—Mr. Charles T. Trowbridge has been appointed Land Commissioner of the Kansas City, Fort Scott & Memphis and its controlled lines.

—Mr. H. J. Andrew has been appointed Commercial Agent of the Cincinnati, Jackson & Mackinaw, with headquarters at Cleveland, O.

—Mr. George W. Chandler has been appointed temporary Receiver for the Harriman & Northeastern, a road 22 miles long, in Tennessee.

—Mr. J. H. Simpson has been appointed Assistant to the General Manager of the Flint & Pere Marquette, with headquarters at Saginaw, Mich.

—Mr. Howard Bryning has been appointed Traveling Passenger Agent of the Chicago, Burlington & Quincy, with headquarters at Cincinnati, O.

—Mr. F. H. tenstein has been appointed Trainmaster of the Flint & Pere Marquette, with headquarters at Saginaw, Mich., to succeed Mr. S. D. Gage, resigned.

—Mr. Frank P. Wade, Passenger and Ticket Agent for the Missouri Pacific at St. Joseph, Mo., has resigned and will be succeeded by Mr. Benton Quick, of Kansas City.

—Mr. C. P. Walker has been appointed Purchasing Agent and Assistant to the General Manager of the Indiana & Illinois Southern, with headquarters at Sullivan, Ind.

—Mr. H. B. Bartman has been appointed Chief Clerk to President Stilwell, of the Kansas City, Pittsburgh & Gulf. Mr. Bartman was formerly connected with the Wheeling & Lake Erie.

—Mr. Frank Q. Brown has been elected Vice-President of the Plant System, in charge of the hotels and lands of the company. Mr. Brown is President of the Florida Southern, one of the company's lines.

—Mr. G. H. Waldo has been appointed Superintendent of Car Service of the Cincinnati, Hamilton & Dayton, with headquarters at Cincinnati, O., to succeed Mr. W. J. Mulvihill, Car Accountant, resigned.

—Mr. J. H. Marvin, formerly of the Auditing Department of the Buffalo, Rochester & Pittsburgh, at Rochester, N. Y., has been appointed Auditor of the Oconee & Western, with headquarters at Dublin, Ga.

—Mr. C. C. Mordough, who was recently appointed District Passenger Agent for the Northern Pacific at Des Moines, Ia., has been transferred to Milwaukee, Wis., to succeed Mr. J. N. Robinson, deceased.

—Mr. H. D. Appgar, for the last five years General Agent of the Missouri Pacific at Nebraska City, Neb., has been appointed General Agent of the St. Louis, Iron Mountain & Southern, with headquarters at Monroe, La.

—Mr. George F. Brownell has been appointed General Solicitor of the Erie, with headquarters at 21 Cortlandt street, New York City, to succeed Mr. George M. Cumming, recently elected First Vice-President of that company.

The Maryland State Board of Public Works has elected Messrs. J. V. L. Findlay and H. Crawford Black State Directors of the Baltimore & Ohio, and Mr. Hanson H. Haines State Director of the Philadelphia & Baltimore Central.

—Mr. Lincoln Van Cott, who for the past six years has been Traveling Auditor of the New York Central & Hudson River, has been appointed Purchasing Agent and Assistant to the President of the Brooklyn Heights electric street railroad.

—Mr. A. J. Richter, who was at one time District Passenger Agent, at Toledo, for the Columbus, Hocking Valley & Toledo, has been appointed Assistant General

<sup>1</sup> People v. Thompson, 46 Pac. Rep., 912.

<sup>2</sup> L. & N. v. Johnson, 37 S. W. Rep., 814.

<sup>3</sup> Walker v. Denver, 76 Fed. Rep., 670.

<sup>4</sup> Chicago v. Union Stock Yards, 45 N. E. Rep., 430.

<sup>5</sup> St. L. I. M. & S. v. Petty, 37 S. W. Rep., 301.

<sup>6</sup> St. L. & S. F. v. Williams, 37 S. W. Rep., 992.

<sup>7</sup> H. & T. C. v. Stewart, 37 S. W. Rep., 770.

<sup>8</sup> Seelig v. Met. St. Ry., 41 N. Y. S., 656.

<sup>9</sup> G. & F. v. Hockaday, 37 S. W. Rep., 475.

<sup>10</sup> L. N. A. & C. v. Bates (Ind. Sup.), 45 N. E., 108.

<sup>11</sup> C. C. & St. L. v. Ward, 45 N. E. Rep., 325.

<sup>12</sup> A. T. & S. F. v. Slattery, 46 Pac. Rep., 941.

<sup>13</sup> T. & P. v. Johnson, 37 S. W. Rep., 975.

<sup>14</sup> M. Pac. v. Geist, 68 N. W. Rep., 640.

<sup>15</sup> Mitchell v. Roch. Ry., 45 N. E. Rep., 351.

<sup>16</sup> Floetli v. Third Ave., 41 N. Y. S., 792.

<sup>17</sup> Consol. T. Co. v. Chenoweth, 35 Atl. Rep., 1067.

<sup>18</sup> G. H. & S. A. v. Haas, 37 S. W. Rep., 167.



Passenger Agent of the Lima Northern, with headquarters at Detroit, Mich.

—Mr. D. S. Wilder, formerly City Passenger Agent for the Cleveland, Cincinnati, Chicago & St. Louis at Columbus, O., has been appointed Division Passenger Agent for the Baltimore & Ohio at the same city, to succeed Mr. W. E. Reppert, resigned.

—Mr. Thomas M. Campbell, General Manager of the International & Great Northern, with headquarters at Palestina, Tex., has resigned and will probably be succeeded by Le Roy Trice, Division Superintendent of the Texas & Pacific, at Marshall, Tex.

—Mr. Hamilton Odell was appointed Referee by Justice Beach in the Supreme Court, at New York City, on May 24, in the dispute between the Manhattan Railway Co. and the Commissioners of Taxes and Assessments as to the payment by the company of taxes for the year 1894.

—Mr. James K. Dillon, formerly Assistant Chief Clerk in the Passenger Department of the Pennsylvania Company, has been appointed District Passenger Agent of the Pennsylvania Lines West of Pittsburgh with headquarters at Pittsburgh, Pa., to succeed Mr. D. C. MacWatters, resigned.

—Mr. R. N. Austin, formerly Assistant General Passenger Agent of the Northern Pacific at St. Paul, has been appointed Assistant General Passenger Agent of the Baltimore & Ohio, with headquarters at Chicago, to succeed Mr. L. S. Allen. It is expected that Mr. Allen will remain with the Baltimore & Ohio.

—Mr. C. Haile has been appointed Freight Traffic Manager of the Missouri, Kansas & Texas, with headquarters at St. Louis, Mo. Mr. Haile was formerly General Freight Agent of the same company, but resigned to become a member of the Board of Administration of the Southwestern Traffic Association.

—Mr. H. Olenbush has been appointed General Freight and Passenger Agent of the Waco & Northwestern, with headquarters at Waco, Tex., to succeed Mr. J. E. W. Fields, resigned. Mr. Olenbush was formerly Local Freight Agent of the company at Waco, and he will continue to discharge the duties of that office.

—Mr. William H. Bartle has been appointed Traveling Freight Agent of the Indiana, Illinois & Iowa in the West, with headquarters in Chicago, to succeed Mr. George L. Forester, who has been transferred to the East. Mr. Bartle is a brother of Mr. J. H. Bartle, General Freight and Passenger Agent of the Indiana, Illinois & Iowa.

—Mr. E. H. Hinton, formerly a representative of the Southern Pacific on the Southwestern Traffic Association, has been appointed General Traffic Manager of the Central of Georgia and of the Savannah Steamship Co., with headquarters at Savannah, Ga. Mr. Hinton was at one time Pacific Coast Agent for the Panama Railroad, and previous to that time was General Freight Agent of the Texas & Pacific, at Dallas, Tex.

#### ELECTIONS AND APPOINTMENTS.

**Alabama Great Southern.**—The office of the Superintendent of Car Service has been abolished and car tracers and correspondence relating to car distribution should be hereafter addressed to C. A. Wickersham, Superintendent, Birmingham, Ala. The car accounts will be handled by B. T. Reynolds, Car Accountant, Washington, D. C., as heretofore.

**Delaware & Chesapeake.**—At the annual meeting of stockholders of this company, which is owned and operated by the Philadelphia, Wilmington & Baltimore, held at Easton, Md., on May 19, officers were elected as follows: President, Frank Thomson; Secretary, Robert H. Groff; Treasurer, Robert W. Smith.

**Flint & Pere Marquette.**—At the annual meeting of stockholders held at Saginaw, Mich., on May 20, the following Directors were elected for the ensuing year: W. W. Crapo, George Coppel, Thomas F. Ryan, R. B. Dodson, J. Lewis Stackpole, Lewis Pierce, Henry B. Stone, H. C. Potter, H. C. Potter, Jr., and John M. Graham.

**Fulton County Narrow Gauge.**—At the annual meeting of the stockholders, held at Lewistown, Ill., on May 19, the following Directors were elected: D. H. Mallory, D. J. Thayer, T. M. Stuart, Joseph Braden, C. R. Kirk, Allan Mallory, E. A. Temple, Moses Turner, A. C. Atherton, Henry Phelps, J. A. Gray and J. A. Westblade. Officers were then elected as follows: President and General Manager, S. H. Mallory; Vice-President and Secretary, D. J. Thayer; Treasurer, F. R. Crocker; Superintendent, Assistant Treasurer and General Freight and Ticket Agent, A. C. Atherton.

**Indianapolis & Vincennes.**—At the annual meeting of stockholders, held recently at Indianapolis, the following Directors were elected for the ensuing year: John E. Davidson, James McCrei, J. T. Brooks, Joseph Wood, W. H. Barnes, John F. Miller and H. H. Hanna.

**Iowa Central.**—The office of General Solicitor, held by Anthony C. Daly, has been abolished, and legal business of the company will hereafter be transacted through the office of the General Manager.

**Kansas City, Northeastern & Gulf.**—The Directors of this company, recently incorporated in Kansas, are: J. J. Squires, Kansas City, Mo.; Andrew J. Fuller, Bethany, Mo.; Alonzo D. Burns, Platte City, Mo.; Henry W. Scott and Ernest M. Munn, New York City; James Timmons, Edwardsville, Kan.; William J. Fuller, Hansford N. Kerr, J. V. Andrews, D. S. Young, W. S. Boylan, all of Kansas City, Kan.

**Lewistown & Buffalo Valley.**—At a recent meeting of the stockholders of this new company, officers were elected as follows: President, M. H. Kulp; Secretary and Treasurer, D. C. Kaseman; Directors, G. G. Kulp, L. T. Rohrbach, G. E. Rohrbach, Harry Landon, M. H. Barr and D. C. Kaseman.

**North Carolina.**—The new Directors recently appointed by Governor Russell for the state have elected R. N. Norment President and E. A. Walton Secretary.

**Pittsburgh, Bessemer & Lake Erie.**—J. T. Blair, formerly General Manager, has been appointed General Agent of the company and will report to the President or Vice-President. The office of General Manager has been abolished and the duties of that office will be performed under the direction of the Vice-President. E. H. Utley has been appointed General Freight and Passenger Agent, with headquarters at Pittsburgh, to succeed Messrs. W. K. Richards and W. G. Sargeant, who were respectively General Freight Agent and General Passenger and Ticket Agent.

**Pittsburgh, Fort Wayne & Chicago.**—At the annual meeting of stockholders, held recently at Pittsburgh, the following Directors were elected to serve for four

years: Charles E. Speer, Pittsburgh; Edward P. Williams, Fort Wayne, and John S. Kennedy, New York City.

**Pittsburgh, Youngstown & Ashtabula.**—At the annual meeting of stockholders held at Youngstown on May 20, Directors were elected as follows: Henry L. Morrison, T. E. Hoyt, Caleb B. Wick, W. S. Bonnell, Jos. G. Butler, Jr.; James McCrei, John E. Davidson, Benjamin Thaw, J. D. Hancock, John P. Green and John N. Hutchinson. At a subsequent meeting of the board the present officers were re-elected.

**Springfield, Little Rock & Gulf.**—The officers of this company, which was recently incorporated in Arkansas, are as follows: President, John A. Hinsey; Secretary, John B. Jones, Little Rock, Ark.; Treasurer, J. H. Bauslog, Springfield, Mo. Directors, John A. Hinsey, J. P. McComman, J. H. Bauslog, C. F. Penzel, James P. Clarke, J. T. W. Tillar and John B. Jones.

**Syracuse, Geneva & Corning.**—At the recent annual meeting of stockholders the following Directors were elected: Chauncey M. Depew, Edwin D. Worcester, Charles C. Clark, Samuel F. Barger, Dwight W. Pardee, James Tillinghast, E. V. W. Rossiter, Daniel Beach, John Lang, Austin Lathrop, A. S. Stothoff, John Magee and D. S. Ellsworth.

**Terminal Railway of Buffalo.**—At the annual meeting of stockholders, held May 19, the following Directors were elected: James C. Evans, Edwin T. Evans, John E. Payne, Frank J. Firth, George E. Bonnell, Frank Hoffman, W. W. Porter, P. R. Perkins, Benjamin Shaw, W. M. Colts, W. H. Barnes and Frank Staley.

**Williamsport & North Branch.**—At the annual meeting of stockholders, held at Williamsport, Pa., May 19, the following Directors were elected: George V. Forman, J. Raymond Claghorn, R. E. Eavenson, J. H. Cochran, E. R. Payne and S. T. McCormick.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Atlanta & Alabama.**—It has been announced that New York capitalists have agreed to furnish necessary capital to build the road from Atlanta, Ga., to Selma, Ala., provided a certain amount of stock is subscribed to elsewhere. The road will extend from Atlanta in a general southwesterly direction through Georgia and Alabama, 190 miles, to Selma. R. M. Mitchell, Atlanta, is President.

**Carthage.**—An extension of this road is proposed from Carthage, about 12 miles to Island Ford, N. C., and it has been announced that contracts for both grading and rails will be let within a few days. The road now extends from Cameron, N. C., to Curriersville, N. C., 21 miles, via Carthage. W. C. Petty, Cameron, N. C., is Lessee and General Manager.

**Cheat River.**—Work on this road, which is being built from a connection with the Baltimore & Ohio, at Rowlesburg, W. Va., along the Cheat River Valley to Fairchance, Pa., and thence to a Pittsburgh connection, is being pushed rapidly. Trains are now being run from Rowlesburg, 2½ miles, to Hamilton, and 150 men are at work grading the line beyond Hamilton. Grading has already been completed six miles from Rowlesburg. It is proposed to build about 30 miles of road before next winter.

**Chicago, St. Louis & Texas Air Line.**—A survey of this proposed line is now being made between San Antonio and Brownsville, Tex., a distance of 270 miles. It is expected that this survey will be completed in about two months, as much of the line will pass through a level country. The road is proposed from Coffeyville, Kan., in a general southwesterly direction through Oklahoma and Indian Territories and Texas, to Brownsville.

**Delaware River Railroad & Bridge Co.**—General Manager Hutchinson, of the Pennsylvania, has given notice that the portion of the line of the Delaware River Railroad & Bridge Co., extending from the eastern end of the Delaware River bridge to its connection with the West Jersey & Seashore at Haddonfield Junction, 5.9 miles, will be completed on May 29, and that the entire line, from its connection with the New York division at Frankford Junction and Haddonfield Junction, 8 miles, including the Fish House and Morris branches and the connection between Merchantville Junction and the Camden Burlington County railroad at Pesauken Junction, opened for traffic on that day. The road will be operated by the Pennsylvania in connection with its New York division. No stations will be built at present.

**Fallsburg & Monticello.**—An amended certificate was filed at Albany on May 19 changing the route of this proposed road to follow the Monticello and Fallsburg turnpike between these two points, five miles, in Sullivan County. The company was incorporated on Jan. 12, 1897, with a capital stock of \$75,000.

**Gulf, Colorado & Santa Fe.**—The company proposes reducing the grades on its main line between Fort Worth and Cleburne, Tex., 29 miles. It is expected that contracts for the grading work will be given within a few days. The work will include the excavation of 30,000 cu. yds. of earth, 10,000 of loose rock and 55,000 of solid rock, besides 220,000 cu. yds. of earth embankment.

**Kansas City, Northeastern & Gulf.**—This company has been incorporated in Kansas with a capital stock of \$1,000,000. Very few of the company's plans have as yet been made public, but it is understood that they provide for building a road from Kansas City, Kan., south to a point on the Gulf of Mexico in Texas. Between Kansas City and Chicago it is believed that the company proposes to obtain trackage rights over existing roads. It is stated that the road will in no sense be a competitor of the Kansas City, Pittsburgh & Gulf. The names of the first Board of Directors are given in another column.

**Little Kanawha Valley.**—Right of way for about the first 30 miles of this proposed road has been secured, and it is stated that all financial arrangements have been made. A number of bids for building the road are now under consideration by the Directors, and it is expected that contracts will be let by June 1. The road will extend from the Ohio River Railroad at Parkersburg, W. Va., through Wood, Calhoun, Gilmer and Braxton counties to a connection with the West Virginia & Pittsburgh.

**Mexican International.**—Dispatches from Durango, Mex., state that a final survey for the proposed extension of this road from Durango, 80 miles, to the mining camp of La Promontorio, has been made and that an order has been placed for rails and ties.

**Mexican Roads.**—Dispatches from Ciudad Victoria, Mex., state that arrangements have been made to build a railroad from that city northeast about 180 miles to Matamoros, near the mouth of the Rio Grande, all in the state of Tamaulipas. The road will reach asphaltum fields about 100 miles from Ciudad Victoria, which have recently been acquired by an American company.

**Occidental (Mexico).**—Mr. H. T. Richards, representing a number of American capitalists, has arranged with Hon. Sebastian Camacho, representing this company, to buy the road which extends from Altata, on the west coast of Mexico, east 61 km. (38 miles) to Culiacan, together with the concession now held by the company for an extension from Culiacan to Salinas del Penon Blanco. This concession has been several times modified, the last time on Jan. 13, 1897, when the Mexican government agreed to grant a subsidy of \$8,500 per kilometer. For subsidy purposes the main line is to be divided into the following four sections: From Culiacan to the Papudos Heights in the Sierra Madre; from the Papudos Heights to Santiago Papasquiaro; from Santiago Papasquiaro to Durango; from Durango to the Gutierrez station of the Mexican Central. The subsidy is to be paid on each section at the end of the fiscal year during which it shall have been completed. The price agreed upon to be paid by Mr. Richards for the property as stated is \$720,000, payable \$50,000 on taking possession of the line, \$50,000 on July next, and the balance in instalments, of which the last is payable in January, 1899.

**Rumford Falls & Rangeley Lakes.**—Surveys have been made for an extension of the road from its northern terminus at Bemis, Me., north about 60 miles to Megantic, Que. It is stated that two lines of survey have been run, one runs due north from Bemis, following the Kennebec River to its head, thence through Bourbon to Megantic, on the east side of Megantic Lake, crossing the Canadian line at Camerons, 35 miles in Maine and 25 miles in Quebec, and the other from Bemis along Capsuptic River to Arnold's Bog, thence down Arnold's River to Megantic, a total of 30 miles on each side of the boundary. The Rumford Falls & Rangeley Lakes is a branch of the Portland & Rumford Falls, from Rumford Falls, Me., north 28 miles to Bemis. The road was opened in May, 1896.

**Sierra (Cal.).**—Grading has been completed on this road for a distance of 20 miles out of Oakdale, Cal., and 10 miles of rails have been laid. A large force of men is now at work beyond Rock River ranch, grading toward Jamestown. It is expected that track-laying will be completed to Montgomery, 20 miles from Oakdale, by July 1. The road is to run from Oakdale, Stanislaus Co., to Coulterville, Mariposa Co., via Sonora, with a branch from Sonora, north to Angel's Camp and other mining towns in that district. Sidney D. Freshman, Oakdale, Cal., is President of the company.

**Southeast Kansas.**—This company has recently been incorporated in Kansas with a capital stock of \$100,000, by John M. Cooper and C. W. Daniels, of Baxter Springs; E. B. Schermerhorn, W. E. Stice, W. F. Sapp and B. S. Moore, of Galena, and J. H. Morgan of Lowell. It is proposed to build a railroad from Baxter Springs, Kan., through Galena to Emporia, 10 miles, and to other points in Cherokee County, Kan. The company's headquarters will be at Baxter Springs.

**South Jersey.**—The branch from Petersburg, N. J., on the main line, east into Ocean City, nine miles, is nearing completion. The only part to be built is that over Bray Island, where trouble was had in securing right of way. The branch is being built by Philadelphia and Camden capitalists, and will be leased to this company when completed. It is expected that new stations will be built at Ocean City and Palermo, through which the line passes.

**Tennessee & Northern.**—Contracts for grading this road, which is to be built from Tennessee Ridge, Houston County, Tenn., north 14 miles to Bear Spring Furnace, have been let, and it is expected that the road will be completed before winter. It is proposed to connect with the Louisville & Nashville at Tennessee Ridge. Charles Seymour, Bear Spring, is Chief Engineer.

**Wilkes-Barre & Northern.**—It is expected that this road, which is being built from Luzerne Borough, Pa., north 20 miles to Harvey's Lake, via Dallas, will be completed during the first part of June, there being now only a small amount of grading and tracklaying to be finished at the northern end of the line. It is proposed to begin running trains between Luzerne Borough and Idetown Summit, a point near the lake, on June 1, and a passenger station is now being built at Idetown. The company was incorporated Jan. 30, 1896. J. B. Reynolds, Kingston, Pa., is President.

#### Electric Railroad Construction.

**Baltimore, Md.**—The contracts for the construction of the extension to Belair road have been awarded as follows: J. L. Blackwell and D. E. Evans & Co. will lay the track and construct the overhead line work. The Pennsylvania Steel Co. will supply the rails and N. W. James & Co. the ties. President Blackstone states that the new lines will be eight miles in length.

**Carnegie, Pa.**—The Carnegie, Heidelberg & Bridgeville Street Railway Co., of Carnegie, was chartered May 20 with a capital stock of \$30,000. The line is to run from Washington avenue and Main street to Third and Main streets. The officers are the same as for the West End, Mt. Washington & Bankville Street Railway Co., mentioned under the Pittsburgh item in this issue.

**Catlettsburgh, Ky.**—The Catlettsburgh & Ashtand Electric Railway Co., operating a railroad between and in Catlettsburgh and Ashtand, Ky., is preparing plans for extending the line through Keova, Ceredo and Central City, W. Va., to Huntington, W. Va. The right of way has been secured through and between Kenova and Ceredo, and negotiations are pending for an entrance into Huntington. The money has been provided for the extension, and the plans are about completed. This extension will give a direct electric line from Huntington, W. Va., to Hanging Rock, O.

**Collegeville, Pa.**—The Schuylkill Valley Traction Co. has accepted the offer of the Town Council and citizens of Collegeville and will immediately extend its line through that borough for a distance of about a mile.

**Doylestown, Pa.**—The Doylestown & Point Pleasant Trolley Co. has secured the consent of all the property owners but three on the Danboro & Point Pleasant turnpike to build the line.

**Huntington, W. Va.**—At a meeting of the City Council of Huntington, W. Va., last Thursday night, the Consolidated Heat, Light and Railway Co. was